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Wright-Patterson Air Force Base, Ohio

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AN EVALUATION OF THE CURRENT
UNITED STATES AIR FORCE ENLISTED
CAREER PROGRESSION SYSTEM AND
FORCE STRUCTURE

Ronald J. Chapin, Captain, USAF
Luis Suarez, Captain, USAF

LSSR 8-81

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Enlisted career progression is directly linked to the composition of the force structure. Under the present career progression system, it is unlikely for a technician in the Air Force to remain a technician for a full career. Faced with the increasing sophistication of our technology and failure to retain technical expertise, a need exists to review current USAF enlisted force structure and career progression policies. This thesis examines and evaluates certain aspects of the enlisted career progression system. The basic concepts, goals, and objectives of the Total Objective Plan for Career Airman Progression (TOPCAP), pertaining to the personnel force, are examined and discussed. Several of the TOPCAP models and force targets are examined and compared to a statistical analysis of retention rates in several highly technical career fields. Several factors which may affect the enlisted force structure in the future are also discussed. By understanding how the system currently operates and what future projections are, alternatives may be found to satisfy the needs of the Air Force.

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AN EVALUATION OF THE CURRENT UNITED STATES AIR FORCE ENLISTED CAREER PROGRESSION SYSTEM AND FORCE STRUCTURE

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

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June 1981

This thesis, written by

Captain Ronald J. Chapin

and

Captain Luis Suarez

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT

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CHAPTER I

INTRODUCTION

Overview

In recent years, the military services of the United States have faced a number of pressing problems including insufficient funds, aging weapons systems (e.g., the Titan Missile and the B-52 Bomber) and a problem which our leaders are beginning to recognize as the most critical problem of all, retention of qualified personnel. The following excerpt from an article written by former Secretary of Defense, Melvin R. Laird, demonstrates the gravity of the situation faced by the services:

> Recruiting people is only half of the personnel difficulty in today's military. Retaining qualified people is an acute problem and will get worse unless remedial action is taken. Approximately 30% of males enlisting do not even complete their first term of enlistment. The services have been losing an average of more than 75% of those completing their first enlistment since 1976. In Fiscal Year 1979 . . . the Air Force dropped below 20% in the first term retention rate for the first time in five years.
>
> While the failure to retain an adequate number of those completing their first term is a severe problem, it is not nearly as important a national defense issue as the failure to retain the requisite number of those who have completed their second and third terms of service. These individuals, who form the backbone of the noncommissioned officers cadre and provide the reservoir of technological skills and experience necessary to operate and maintain our sophisticated weapons systems, are irreplaceable. It takes at least a decade for a military novice to gain the training and experience possessed by these individuals. Yet, the defense

> establishment is losing them in record numbers. None of the services is currently retaining more than 60% of its second termers. . . . Over the past few years, the second term retention rate in the Air Force declined from 75 to 59%. . . . Retention rates for third-termers--people who have completed approximately 11 years of services--are also in decline [20:61].

The loss of technicians is significant for economic reasons. In the article quoted above, Mr. Laird states that "an electronics technician costs almost $100,000 to train [20:66]." However, the importance of the shortage of technical expertise goes beyond the economic realm. Experienced technicians are critical to our defense and possibly to our very survival. The following quote from Government Executive Magazine illustrates this point:

> . . . the personnel shortfall both in quantity and especially in quality will get worse--at precisely the critical time, between now and 1985, when intelligence analyses claim the United States will be most vulnerable to foreign military threat [27:23].

Retention of personnel is a highly complex problem involving, among other things, pay and benefits which are beyond the scope of this work. The importance of retention factors such as pay and benefits is receiving wide attention at this time. However, there are factors other than economic factors which also deserve attention. Air Force policy statements continually emphasize the importance of recognition and job satisfaction. For example, this is an excerpt from a recent TIG Brief addressing Air Force supervisors:

> Regular pay, retirement benefits, and compensation ARE important. But surveys continually point out that the "stay-in or get-out" decision is very strongly influenced by the immediate working environment, and the sense of belonging, contributing, and being recognized in the workplace. THAT'S where the rubber really hits the road. And there's only one person who can make that happen--YOU [11:10].

Several problems have been enumerated which are of immediate concern to the United States Air Force. They are: retention of qualified technicians, the high cost of training new technicians, and the possible vulnerability of our nation during the next several years. It may very well be that our best technicians are sitting behind a desk; forced by the enlisted career progression system to be supervisors. If so, a review of present policies may be required to help the Air Force satisfy its critical needs.

Problem Statement

Enlisted career progression is directly linked to the composition of the force structure. A thorough understanding of the USAF personnel structure is a prerequisite to arriving at intelligent conclusions regarding the enlisted career progression system.

Under the present system, it is unlikely for a technician in the Air Force to remain a technician for a full career. At a mid-career point, a technician is forced to become a part-time supervisor in order to be promoted. The higher that technician progresses up the promotion ladder the more time he[1] spends as a supervisor until, ultimately, he is no longer a technician.

Faced with the increasing sophistication of our technology and failure to retain technical expertise, a need exists to review current USAF enlisted force structure and career progression policies. By understanding how the system currently operates, alternatives may be found to satisfy the needs of the Air Force.

Scope

This thesis examines and evaluates certain aspects of the enlisted career progression system. The basic references and concepts used in the evaluation are described in the USAF Personnel Plan, Volume I, Personnel Management and Objectives, and Volume III, Airman Structure and Airman Structure Annexes, which deal with the Total Objective Plan for Career Airman Personnel (TOPCAP). Several models, which are the basis of the TOPCAP plan, are examined and evaluated to determine their validity in the current environment (see Figure 1-1).

Several highly technical career fields (AFSCs 304X0, 316X0, 326X0, 461X0, 423X0, and 511X0) are evaluated

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[1]Throughout this thesis the masculine gender is used for the sake of convenience. The authors recognize the valuable contribution of the female members of the force and there is no intention to slight them.

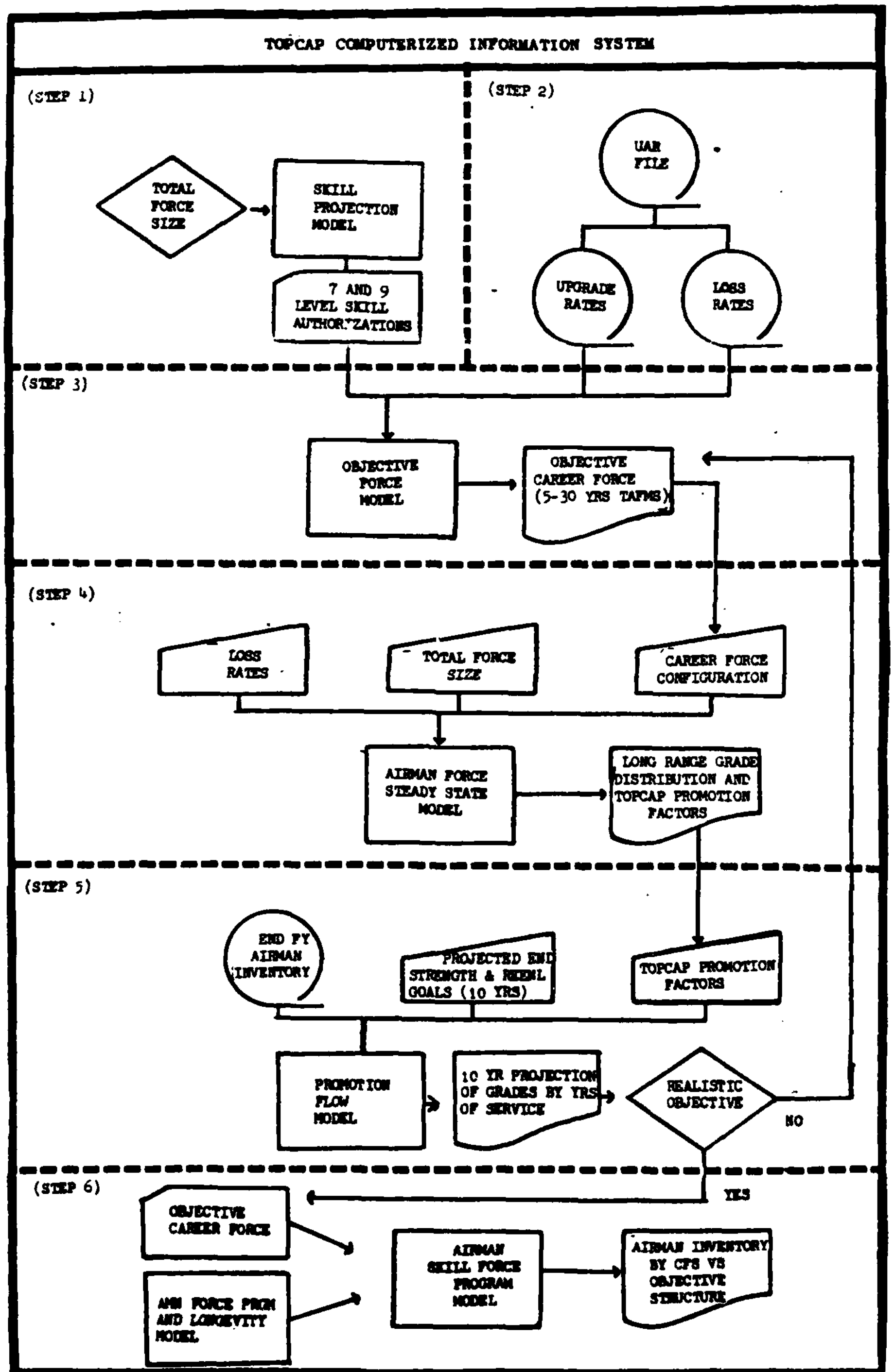


Fig. 1-1. TOPCAP Computerized Management System (10:F-6)

(see Table 1-1). The evaluation period extends from 30 June 1973 through Fiscal Year 1980. That particular starting date was chosen because the recording of information for first term, second term, and career retention breakouts began then. Fiscal Year 1980 marked the latest available information.

TABLE 1-1

CAREER FIELD SUBDIVISIONS (CFS)

Group 1--304X0:	Radio Repair Analyst/Technician
Group 2--316X0:	Missile System Analyst/Technician
Group 3--326X0:	Avionics Technician
Group 4--423X0:	Aircraft Maintenance Technician
Group 5--461X0:	Munitions Technician
Group 6--511X0:	Computer Specialist Technician

Background and Literature Review

The background literature review explored three different classes of information:

1. Official Department of Defense and Air Force publications and documents. The information found in this class forms the basis for a significant portion of the thesis.

2. Official Department of Defense and Air Force data and statistics. This type of information consists of

miscellaneous reports received from AFMPC and HQ USAF/MPX, and personal interviews (21).

3. Non-military publications, information, and other data. This type of information consists of information obtained from non-DOD sources.

Various Air Force regulations, manuals, and studies pertaining to the USAF enlisted structure were reviewed for applicable material. During the literature review, a glossary of key terms to be used in the thesis was compiled (see Appendix A).

Related Research

This thesis is part of a three-year research effort attempting to determine whether it would be practical or feasible for the Air Force to eliminate or modify the current upward progression policy and allow an enlisted technician to remain in his specialty as a "doer" for a full career. The ultimate goal of the research effort is to develop recommendations to improve upon the current enlisted career progression system in highly technical career fields.

The research effort may be viewed as a three-tier pyramid, the third tier being the final thesis of the project (see Figure 1-2).

The first tier was accomplished during the first year (1979-80) to establish an informational base to aid

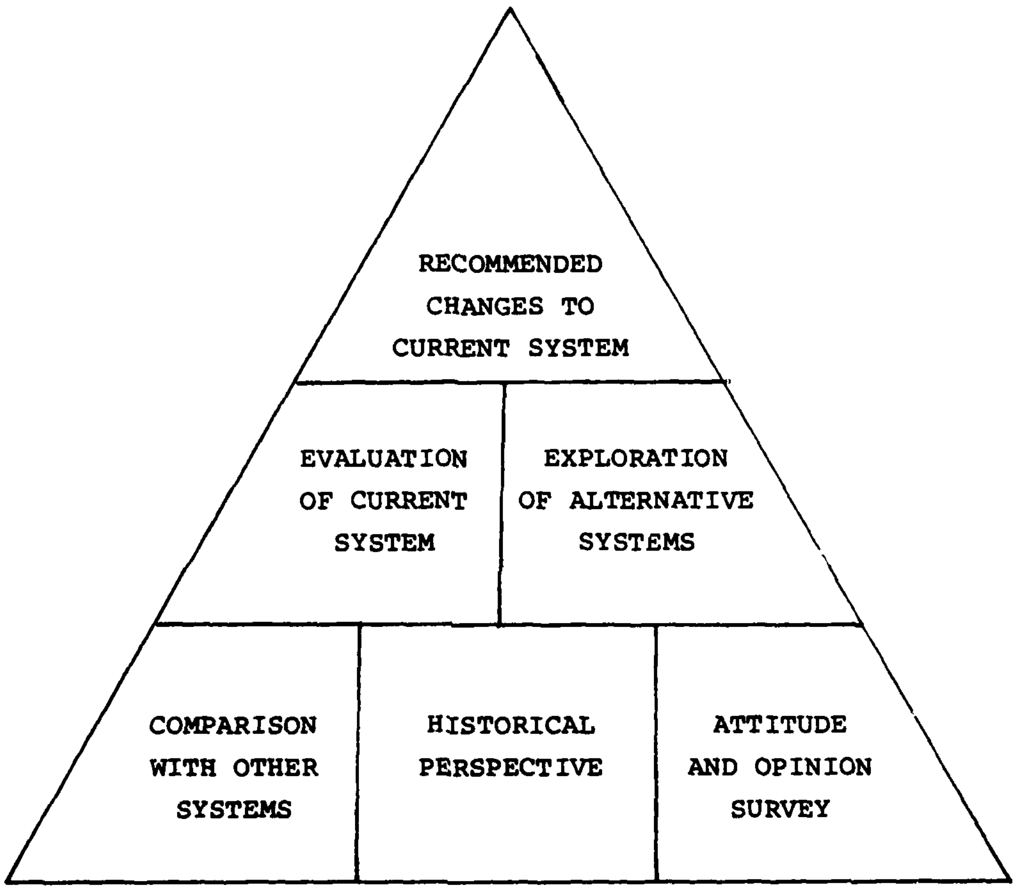


Fig. 1-2. Pyramid of Proposed Research

the succeeding researchers. The first tier consists of the following elements:

1. An exploration of enlisted attitudes concerning career progression. Co-authors Captain Gary W. Pierce and Captain Erika A. Robeson used a survey to explore the attitudes of aircraft maintenance technicians concerning their perceptions of progression and promotion in their career field under the present system.

2. A historical perspective of the events leading to current upward progression policies. Co-authors Captain Clark K. Nelson and Mr. Francis J. Hall described and examined the different systems and programs that have led to the present progression system.

3. An examination of alternative career progression structures. Co-authors Captain Edward A. Richter and Captain David C. Tharp conducted a study of progression in systems in the Army, Navy, and British Royal Air Force, and a civilian airline. Their objective was to identify, investigate, and analyze the similarities and differences between the current enlisted career progression system of Air Force aircraft maintenance technicians and those of the organizations listed.

This thesis forms a portion of the second tier and provides further information for use by the final thesis team. The second tier is composed of the following elements:

1. An evaluation of the current enlisted career progression system--which is this thesis.

2. Exploration of alternative enlisted career progression systems. Co-authored by First Lieutenant Terry L. Hiatt and First Lieutenant Wayne E. Nunnery.

The third tier of research is scheduled for completion during year three (1982). Using the information compiled by the previous five thesis teams, the final team will recommend an optimal enlisted maintenance career progression plan for the Air Force.

Research Objectives

Our research objectives consisted of one general overall objective and three specific objectives. The overall general objective, the goal of the three-year research effort, is to determine whether or not it would be practical or feasible for the USAF to eliminate or modify its upward progression policy for maintenance technicians and permit a force of career technicians (see Figure 1-2).

The specific objectives of this thesis are:

1. To add to the existing information base for the final thesis effort.

2. To discuss TOPCAP objectives, concepts, and goals.

3. To describe and evaluate the enlisted force structure and personnel management system and gain an understanding of career progression objectives.

4. To analyze the TOPCAP model structure and compare it with the current enlisted inventory in several highly technical career fields to determine whether TOPCAP objectives are being met.

Research Questions

The research objectives are met by answering a series of questions related to the TOPCAP management plan, and current manning and retention information received from HQ USAF/MPC. The specific questions are:

1. What are the Air Force personnel policy, personnel management philosophy, and the objectives underlying TOPCAP?

2. What are the models on which TOPCAP is based and how do they work?

3. TOPCAP is a standard indicating what the enlisted force structure should be. What are some of the factors which influence the "real world" enlisted force structure and how will they affect TOPCAP objectives in the future?

4. How does the Air Force personnel management system function?

5. The objective of the Air Force personnel system with regard to enlisted force manning may be viewed as: insuring that the right quantity and mix of personnel resources is available to accomplish those tasks normally assigned the enlisted force. If the system is losing people, especially in critical areas, is something wrong with the system?

6. Is the current enlisted force structure compatible with the configuration needed to arrive at the desirable distribution of grades for the objective force?

7. Should TOPCAP continue to be based on the present career progression tier concept?

CHAPTER II

RESEARCH METHODOLOGY

Introduction

This chapter presents the methodology to be used in this thesis. It consists of a data collection plan, a data analysis plan, an assumptions section, and a limitations section.

Data Collection Plan

Statistical Data

Data was gathered relative to a population of enlisted personnel composed of first term enlistment, second term enlistment, and career groups from the career fields listed in Table 1-1. The information obtained from the data base was employed to determine whether TOPCAP retention objectives were being met.

Research data collected was secondary data acquired from various HQ USAF and AFMPC sources. The information compiled from the research data addressed manning figures by rank and career field for the period 1973 to 1980.

TOPCAP Information

Information was obtained from the TOPCAP Office of Primary Responsibility (OPR) concerning the TOPCAP models and how they operate. This information was evaluated and separated into the functional areas of the TOPCAP models, current system data, and future trends data.

Other Information

Various other sources of information were used including Air Force publications and DOD studies and reports.

Collection Methods

Two main methods were used to collect data for this thesis: telephone interviews and mail correspondence. The telephone was used to request information from the various agencies and to supplement the information received by mail.

Data Analysis Plan

The data received was analyzed to derive the information required to satisfy the thesis objectives and research questions. Questions 1, 2, 3, and 4 were addressed by a review of applicable regulations and miscellaneous reports and through discussion of TOPCAP with Air Force personnel sources. Question 5 was of a judgmental nature. Inferences were made from the available information to draw conclusions about that question. Statistical analysis was used to answer Question 6. The statistical methodology is presented in Appendix B. Question 7 was addressed in the final chapter as part of the conclusion.

Assumptions

It was assumed that no drastic changes will be made to the enlisted structure or promotion system for the next two years. A portion of this thesis addresses the TOPCAP model structures in some detail. Two assumptions were made concerning the TOPCAP models. First, that the models will project an optimal TOPCAP structure which will be reached by 1987. Second, that statutory limitations placed on the career force and TOPCAP models will remain constant through 1987. Finally, it was assumed that the statistical results obtained were valid only for the data supplied by AFMPC and Headquarters USAF/MPX and apply only to the AFSCs involved. However, generalizations were made about the other AFSCs, based on the statistical analysis.

Limitations

There were two main limitations pertinent to this thesis. First, the statistical analysis was based on secondary data. That is, the data was gathered by AFMPC and Headquarters USAF/MPX and submitted to the authors. Operational and time constraints prevented the gathering of the data in a more direct mode. Second, the statistical analysis was limited to six technical AFSCs and to the Logistics and Maintenance career fields due to time constraints placed upon thesis completion.

CHAPTER III

AIR FORCE PERSONNEL MANAGEMENT OBJECTIVES

Introduction

The USAF Personnel Plan is the guiding directive of Air Force personnel management. Volume I of the plan contains the Personnel Management Objectives. Volume III contains the Total Objective Plan for Career Airmen Personnel (TOPCAP) which deals with the enlisted force structure and supports Volume I.

Two of the first tier theses discussed TOPCAP. "A Comparative Analysis of Enlisted Career Progression Systems," by Richter and Tharp, discussed the Air Force enlisted career progression process. The second thesis, "A Historical Perspective of the United States Air Force Enlisted Personnel Promotion Policy," by Hall and Nelsen, discussed TOPCAP objectives and force structure briefly.

This chapter goes beyond what was done previously by presenting the Air Force personnel policy and discussing the concepts, goals, and objectives on which TOPCAP is based. First, the Air Force personnel policy is discussed. Then, the Air Force personnel management philosophy is explored through a review of the personnel force concepts and of certain selected goals. Next, the specific

Airman Management Objectives are discussed. Finally, the authors' evaluation of the system is expressed.

Overview

The introduction to Chapter I, USAF Personnel Plan, expresses the Air Force personnel policy. Air Force personnel policy evolves from several key ideas. These ideas are "force orientation" versus "event orientation," the existence of environmental conditions which allow the determination of characteristics desirable in the force, and the maintenance of a selectively recruited career force as the core of the airman personnel force (8:p.1-1).

"Force orientation" versus "event orientation" means that Air Force policy makers understand that world events dictate changes in national security objectives and those changes, in turn, cause mission changes. Rather than trying to predict the future, the fulfillment of future manning requirements are satisfied by maintaining an inherently flexible personnel force. Consequently, Air Force efforts in the personnel field are aimed at attaining, training, and maintaining an effective force. The core of that force is a highly trained, highly motivated, selectively recruited career force (8:p.1-1).

Air Force planners are aware that to retain the select individuals desired in the force the personnel management system must be responsive to certain environmental conditions expected to predominate in the future. The USAF Personnel Plan, Volume I, gives the following examples:

> For example, we can be assured that future technology will increase in complexity. Consequently, we must attain, train, and maintain a personnel force that is abreast of technological advances and proficient in their use. . . . We know that standards of living increase, as requirements for skilled personnel increase, and as we strive to sustain the force in an all-volunteer environment, we must provide incentives and entitlements comparable to those in the private sector in order to remain competitive for the available personnel resource [8:p.1-1].

Air Force Personnel Management Philosophy

The Air Force personnel management philosophy is based on three concepts. The concepts are--the Total Force Policy, the Personnel Life Cycle approach, and Management by Objectives (8:p.1-1).

The Total Force Policy is a total system view of the Air Force which considers all elements of the force (i.e., officer, airman, active reserve, and civilian) to determine the optimum force structure to support national objectives (8:p.1-1).

The Personnel Life Cycle approach is a systematic approach used to manage the personnel resource from entry in until exit from the force. The Life Cycle approach consists of five phases: Procurement, Education and Training, Utilization, Sustainment, and Separation and Retirement. These phases are defined and discussed in more detail later in the chapter (8:p.1-1).

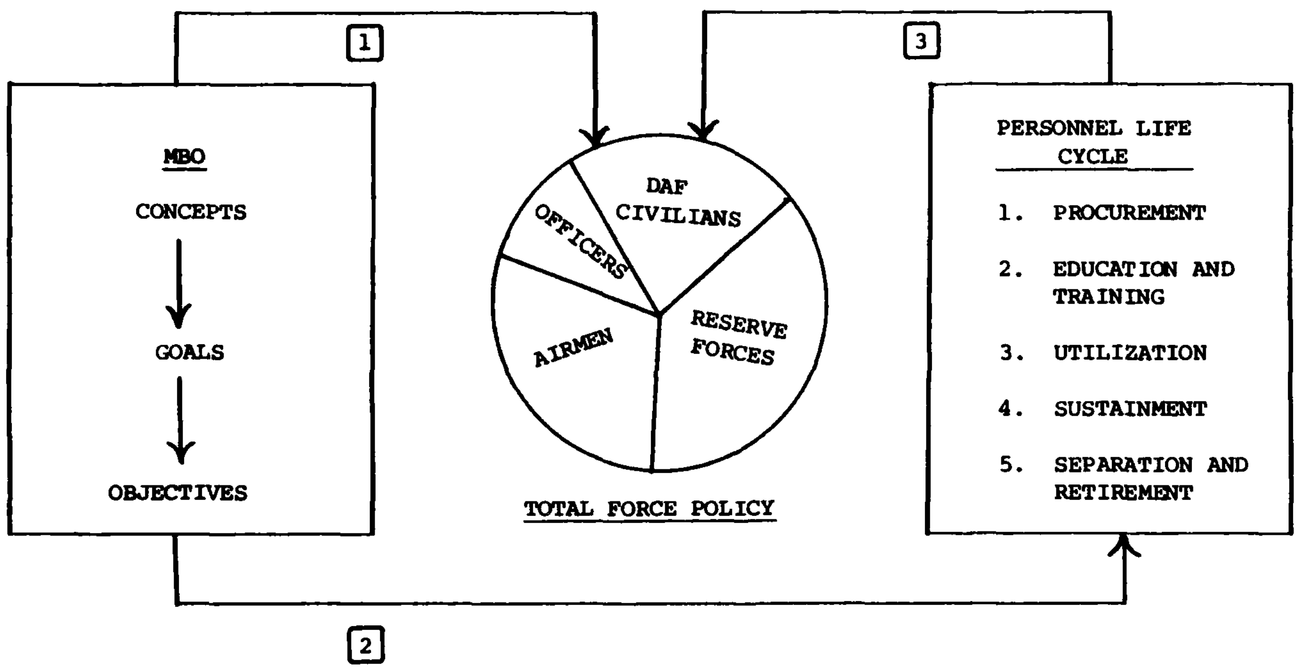
The third concept, Management by Objectives, consists of a hierarchy of concepts, goals, and objectives. A total of eleven concepts are used to structure the personnel force and to define the management of the personnel system. Goals evolve from the concepts and describe the configuration of the desired force. Finally, specific objectives are derived to enable goal attainment (8:p.1-1).

Management by Objectives provides a common ground for viewing the Total Force in its entirety and relating objectives established for force elements to the phases of the Personnel Life Cycle (8:p.2-2). Figure 3-1 aids in visualizing this relationship.

Two of the three concepts, Management by Objectives and the Personnel Life Cycle, are significantly relevant to the objectives of this thesis. Therefore, these two concepts are discussed in more detail. First, the specific concepts and goals related to personnel force management are discussed. Next, the Airman Management Objectives are discussed within the framework of the five Personnel Life Cycle phases.

Concepts and Goals

The USAF Personnel Plan, Volume I, Chapter 1, contains six concepts outlining the personnel force. Goals are also listed which support the concepts. These six concepts and several relevant goals follow.



ACTIVITY: 1. STRUCTURE FOR PERSONNEL RESOURCE
2. GUIDE FOR MANAGEMENT OF PERSONNEL SYSTEM
3. MANAGEMENT OF PERSONNEL RESOURCE

Fig. 3-1. Concept Interrelations

Concept 1, A Balanced Force. The force must be designed to achieve a logical balance of generalists and specialists, composed of officers, airmen, and civilians who have the skills, knowledge, education, and grades required to accomplish the Air Force mission. The components of the force will consist of career or noncareer, rated or nonrated, and active or reserve elements [8:p.1-2].

Goal 1.4. To maintain a force consisting of generalists and specialists which will provide career development, broad utilization of career elements, and also an adequate number of careerists to provide executive and managerial direction of highly specialized functions [8:p.1-2].

Concept 2, A Flexible Force: The force must be flexible; that is, capable of responding to changing requirements or constraints in terms of size, composition, use, and movement [8:p.1-2].

Goal 2.3. To maintain a career force in which the degree of individual specialization allows for broad utilization in related skills to meet management demands and inventory imbalances [8:p.1-3].

Concept 3, A Structured Force: The force must be structured with grades and skills that identify the individual in terms of responsibility and capability and provide a means for progression in position and pay [8:p.1-3].

Goal 3.1. To maintain a structured force to meet requirements in terms of grade, promotion progression, skill level discrimination, levels of responsibility, and to provide pay levels correlated with longevity/seniority, responsibility, and skill demands [8:p.1-3].

Concept 4, A Quality Force: The force should consist of people, without regard to race, color, creed, or sex, who possess the moral standards, skills, aptitudes, education, experience, and physical characteristics necessary to meet current and future requirements [8:p.1-3].

Concept 5, A Motivated Force: The force must be motivated to participate willingly to achieve the Air Force mission. The structure and the management of the organization must meet psychological human needs. Each individual must have a clear understanding of purposes, aims, and objectives. Personnel should be afforded ample opportunities for achievement, growth, and recognition [8:p.1-3].

Goal 5.1. To recognize basic human needs, aspirations, and limitations in the planning, organizing, directing, and controlling of human resources [8:p.1-3].

Goal 5.3. To sustain an environment which affords an opportunity for individual achievement [8:p.1-3].

Goal 5.4. To maintain opportunity for individual growth [8:p.1-3].

Concept 6, A Professional Force: The career element of the force must be disciplined and dedicated, must practice the highest standards of integrity and conduct, possess a common body of knowledge, and display a professional image both internally and externally [8:p.1-3].

The USAF Personnel Plan contains eleven concepts and forty-four goals. The authors felt the concepts and goals provided were the most relevant to gain an insight into the "up or out" philosophy.

Airman Management Objectives

The purpose of the Airman Management Objectives is to directly support the concepts and goals. They also provide personnel managers with guidance for attaining and maintaining the desired force posture (8:p.4-1). The Airman Management Objectives are contained in the USAF Personnel Plan, Volume I, Chapter IV.

Objectives are given, for the airman personnel resource, for each of the five phases of the Personnel Life Cycle. Figure 3-2 depicts the objectives as they correspond with the five phases. A synopsis is provided

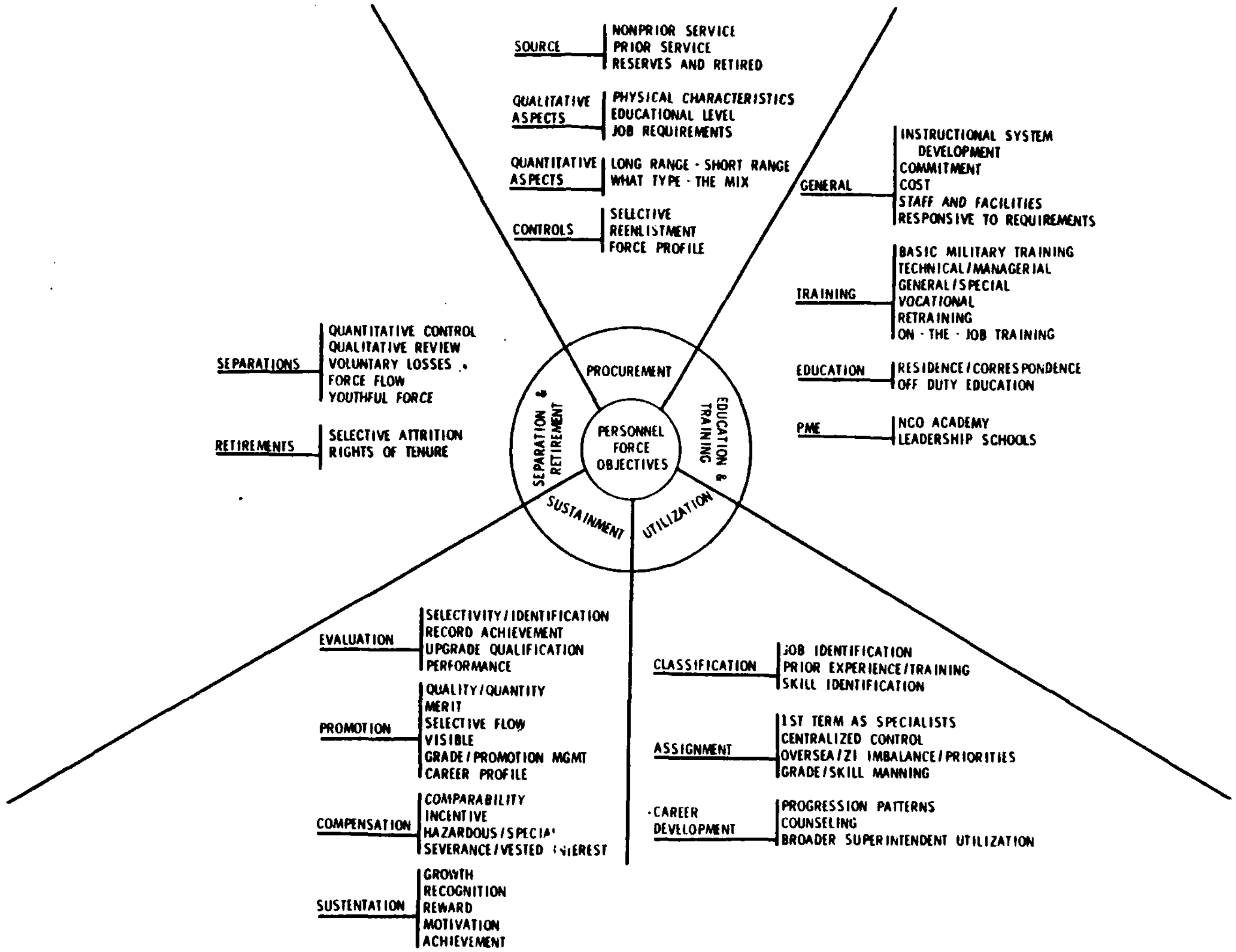


Fig. 3-2. The Personnel Envelope--Airman (8:p.4-12)

for each objective to summarize the essence of the objectives in each phase of the cycle. In addition, each phase is defined.

Procurement Phase

The Personnel Plan refers to the procurement phase as: ". . . the phase in which we access the individual into the Air Force. This includes recruiting, enlisting, commissioning, retention, and recall for all elements of the force [8:p.1-1]." The procurement objectives are divided into enlistment of nonprior service airmen objectives, and the career force objectives.

Enlistment of nonprior service airmen objectives are concerned with factors such as: the satisfaction of total airman end strengths both currently and in the future, and the establishment of selective recruitment and training requirements to meet standards. These objectives are primarily aimed at the recruitment of quality first termers, a portion of whom will become part of the career force (8:p.4-1).

Career force objectives are: to develop career force entry objectives for first term and prior service airmen to meet TOPCAP objectives; to reenlist first term airmen based on established criteria and proven performance; to recall qualified reserve and/or retired airmen in situations where other sources can't satisfy requirements;

and, to reenlist career airmen for varying periods of time to satisfy requirements (8:p.4-2). These objectives decide which airmen will be allowed into and remain part of the career force.

Education and Training Phase

The education and training phase is concerned with ensuring that the personnel force is trained at the level required to meet Air Force requirements. Training objectives are generally related to instruction in military subjects or in a specific Air Force Specialty. Education refers to the study of subjects in the realm of professional leadership and management which apply to the organization and operation of the Air Force as a whole. The emphasis in the education and training area is on replacing the loss of skills through training and education and at the same time reducing the costs involved in the process as much as possible (8:pp.4-3 to 4-4).

Utilization Phase

The utilization phase includes the classification, assignment, and career development of the total airman resource (8:p.4-5). Objectives have been established in each of these areas to support the utilization effort.

Classification is the identification of job requirements necessary to accomplish a particular mission and the identification of individual abilities which qualify a person to perform in a particular specialty. Objectives in this area attempt to reflect job requirements in terms of individual knowledge, education, experience, and training. Occupations are identified through the use of the Air Force Specialty Code (8:p.4-5). The classification system does not look favorably on overspecialization as expressed in the USAF Personnel Plan, Chapter 4:

> During recent years rapid technological changes have resulted in a significant increase of specialties and shredouts. The complexity of jobs has resulted in a larger number of more narrowly specialized positions. Personnel managers must strive to attain an ideal balance of training so as not to restrict personnel to narrow fields through overspecialization, but broaden their education enough to allow for flexibility in job assignment. The challenge to managers is to develop a set of specialties narrow enough so that airmen can learn their specific jobs, yet broad enough to make them qualified in a reasonable variety of jobs in the CONUS and overseas [8:p.4-5].

The assignment function is the process by which the airman resource is distributed to Air Force organizations. The objectives in this area include: the assurance of mission accomplishment, satisfying valid personnel requirements, maintaining a reasonable degree of CONUS stability, an equitable distribution of short tours, and rotation of individuals through a variety of assignments to provide maturity and leadership experience (8:p.4-6).

Career development addresses the professional and managerial growth of the individual to satisfy the needs of the Air Force and the personal desires of each career airman when possible. Objectives are designed to provide more visible and acceptable career development patterns and better utilization of airmen who have received special and technical training. Of special importance is the identification of noncommissioned officers able to assume greater responsibility so they can continue career development through future assignments (8:p.4-7).

Sustainment Phase

The sustainment phase is described as follows:

> The management activities of evaluation, counseling, promotion, compensation, and sustentation, which are included under the broad term of sustainment, are vital to each individual's personal esteem, welfare, and attitude toward the Air Force [8:p.4-7].

Objectives established for the activities of evaluation, promotion, compensation, and sustentation will be discussed briefly.

Evaluation objectives deal with the establishment of valid and equitable systems in areas such as promotions, assignments, and retention. The integrity of the evaluation system is crucial to the quality and motivation of the career force (8:p.4-7).

Promotion management is visualized in two areas: grade management and promotion management. Grade management is the rank system through which airmen receive financial compensation. According to the Personnel Plan,

> The purpose of grades is two-fold: first, to furnish the means of distinguishing leadership and supervisory levels in an ascending progression, and, second, to help provide the highest level of motivation [8:p.4-8].

In addition, the plan states:

> Effective grade management requires the establishment and maintenance of a desired long-term career airman profile. This profile must encompass a promotion program and a grade structure which provides for promotion flow and provides motivators to influence retention. Grade management is the long-range process for enlisted promotion management [8:p.4-8].

Promotion management is concerned with the establishment of controls to ensure that there are sufficient airmen in each grade to satisfy Air Force requirements. The objectives in this area include: the establishment of a visible and equitable promotion system, stable promotion opportunities at reasonable intervals, and the justification and utilization of loss management authority to achieve a credible advance environment (8:p.4-8).

Compensation is viewed as a means to reward job performance and also as an incentive to enter and remain in the career force. The need for adequate compensation is recognized. Objectives in this area include: the payment of Selective Reenlistment Bonuses (SRBs) as a financial inducement to improve retention in critical skill jobs, separation pay for careerists separated short of retirement, hazardous duty pay in jobs recognized as inherently hazardous, and additional pay to reduce the financial burden of frequent reassignments, temporary duty, and other separations (8:p.4-9).

Sustentation is the process associated with the psychosocial needs of airmen. The purpose of this function is to assure potential careerists that their continued active duty service will be more gratifying than a career somewhere else. Objectives include: recognition of individual achievement, opportunities for more responsibility and authority, positive action on the part of management to minimize irritants and other factors adversely affecting the individual airman, and counseling by supervisors for the purpose of assisting subordinates in improving performance in their present positions and advising them on their future careers (8:pp.4-9 to 4-10).

Separation and Retirement Phase

This phase deals with the separation or retirement of airmen from the active force according to the needs of the Air Force or the desires of the individual. Objectives in this phase include: maintenance of a desired first term/career force ratio, flexibility to stay within a desired airman force profile that will preclude promotion stagnation, separation or retirement of airmen who don't measure up to personal conduct and duty performance standards (8:p.4-11).

Authors' Evaluation of Management System

Air Force personnel policy is a rational, logical approach to a highly complex process in a dynamic environment. A well-trained, highly motivated force which can be expanded or contracted as required is a sound approach. A career force to provide continuity, commitment to the organization, and training for the first term force is a logical manner to deal with uncertainty.

The fundamental concepts which form the basis for the Air Force personnel management philosophy are rational and sound management practices. However, the lack of flexibility in the enlisted career progression system, for highly trained technicians, is a glaring weakness in the system which deserves attention.

The Rand Corporation, in a study entitled Air Force Manpower, Personnel, and Training System, identified that weakness as a limitation in the following manner:

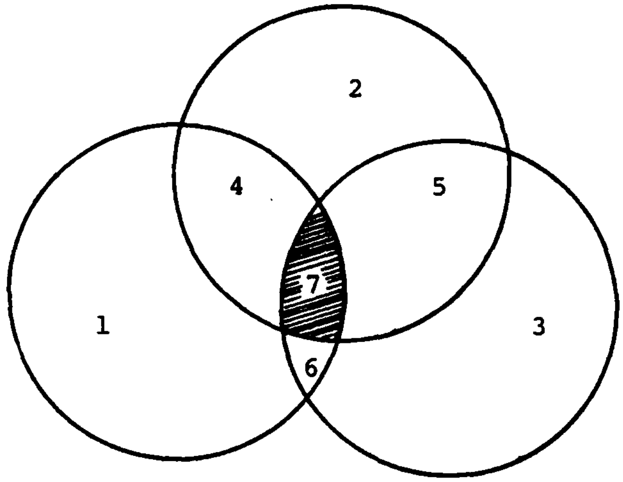
> Only sporadic attention is focused on aspects such as the personnel job classification scheme or manpower utilization policy changes which would allow more senior enlisted personnel to continue working as technical specialists rather than requiring their transition into management roles. Such limitations, we believe, may be partially manifest in collateral systemic problems such as cost overruns, failure to meet production objectives, excessive overtime, recurring necessities for high-level decisions to make across-the-board personnel or program reductions, and the loss of valuable senior technicians [4:iii].

The study went on to state that this issue has a significant impact on all aspects of the system (i.e., manpower, personnel, and training) but the system is not considering the implications. According to the study:

> Consideration of the combined implications for manpower, personnel, and training also should occur during evaluation of certain personnel policies. An example is the policy of advancing enlisted personnel into the ranks of management as noncommissioned officers as opposed to retaining some as senior technicians. That is, typically, once a specialist attains a certain level of experience and technical competence, his only options are to be promoted to a supervisory position or to leave the Air Force. Essentially, the subject here is similar to the "up-or-out" issue so often discussed for officer personnel. One policy option is to allow some airmen to progress into higher enlisted grades and continue working as technical specialists rather than supervisors; thus, the issue here is really a matter of personnel utilization. The ramifications for unit manning, retention, force structures, recruiting, training, costs, and mission capability are important; but a ready means for considering these combined effects is not available [2:51].

The personnel management system has an inflexible, preconceived idea of what every member of the career force should be. The Personnel Plan states: "The military professional is typically viewed in three roles--as a leader, manager, and technician--in optimal balance." This relationship may be represented as in Figure 3-3. As this figure demonstrates, the Air Force personnel management system focuses on a select group of individuals who possess an elite combination of qualities and talents. Career advancement is meant for that selected group of individuals only.

Once these individuals have been recruited and highly trained, the Air Force must use and sustain them



1. Leaders
2. Managers
3. Technicians
4. Managers with leadership qualities
5. Technicians with management potential
6. Technicians with leadership qualities
7. Technicians with leadership qualities, and management potential

Fig. 3-3. The Military Professional

effectively in order to retain them. If all individuals retained in the career force fit "the mold" (i.e., possessed leadership and management potential and technician abilities) and, in addition, wanted to be managers, the system would function perfectly. That is, assuming an inexhaustible supply of such individuals exists. However, the actual situation may be more complicated than that.

Several feasible conditions that may affect the career force are:

1. An individual is a good technician, has managerial potential and leadership qualities, and wants to be a manager.

2. An individual is a good technician, has managerial potential, has poor leadership potential, and wants to be a manager.

3. An individual is a good technician, has little or no managerial potential, has leadership qualities, and wants to be a manager.

4. An individual is a good technician, has little or no managerial potential, has leadership qualities and doesn't want to be a manager.

5. An individual is a good technician, has managerial potential, has poor leadership potential, and doesn't want to be a manager.

6. An individual is a good technician, has managerial potential, has leadership qualities, and doesn't want to be a manager.

All six hypothetical individuals are good technicians in whom the Air Force has invested possibly up to $100,000 to train. However, the system, ideally, wants to advance only individual number 1 to a position of higher responsibility (i.e., a managerial position). If the other individuals are promoted, a conflict may be created in the system.

Assuming that managerial potential implies that an individual has demonstrated, through performance, ability to perform well on WAPS tests and other promotion criteria and that leadership qualities imply an inherent capability to motivate and lead other people, let's briefly compare the other five hypothetical situations (numbered 2-6) and relate them to Air Force concepts, goals, or objectives that may apply.

Individual number 2 may have a good chance to be promoted, even though he may not be a leader, because of the inflated APR system. If he is promoted, his inability to work well with others may conceivably hurt the Air Force through poor morale and poor motivational considerations affecting his subordinates.

Individual number 3 may be a good leader and may want to manage, but, since he lacks managerial ability, he may not advance in the system. Being a good technician and a leader and wanting to manage is not enough if you can't be promoted. This individual may remain in the force and feel a sense of frustration. He will reach a point where he will stagnate in terms of grade, promotion progression, and level of responsibility. His sense of achievement, growth, and recognition will be affected. There may be no way to motivate this individual since the system does not reward his strongest characteristics after a certain point. His desire to be a manager may deepen his sense of frustration.

Individual number 4's situation is similar to number 3's except that he doesn't want to be a manager.

Individual number 5 may have a good chance for promotion since he possesses managerial capability. However, his poor leadership potential and lack of desire to be a manager, make him a poor candidate for advancement as far as the system is concerned. If he is promoted his subordinates may suffer the consequences of this individual's frustration.

Individual number 6 has a very good chance for promotion. If he is promoted, he may or may not be a good manager. However, even if he is a good manager he will feel a sense of frustration because he wants to be a technician rather than a manager. This type of individual may, conceivably, not advance intentionally to be able to remain a technician.

These illustrations may be related to the personnel force concepts 3 and 5. Concept 3 structures the force and establishes requirements for promotion progression and concept 5 stresses the importance of motivation. It appears that the structure of the force dictates how individuals will progress. Though motivation has an equally important status as a concept, in practice it may be subordinate to the force structure and progression system as it now exists.

The point of these illustrations is that there is no flexibility in the system. In order to advance, good technicians may be forced to become managers against their wishes. Some good technicians may become managers without the capabilities or desire to manage or lead, and thereby hurt the system. Others may not advance even though they are exceptional technicians. There is no alternative for these good technicians but to get out or stay in and feel frustrated.

The importance of motivated personnel to the Air Force was explained by Major General Jeanne M. Holm as follows:

> The major challenges and concerns of the armed forces in the period of the 70s and beyond are, and will continue to be, in the field of personnel. You can devise all of the technologically sophisticated systems

> in the world, but without people in the quality and quantity required to operate these systems, to fix them, and to control them, you are nowhere. Moreover, given all of the people you need with the skills required, they are almost worthless to you if they are not adequately motivated to do what has to be done when it needs doing [7:p.3-9].

The terms motivation, job satisfaction, motivators, and individual growth and/or achievement are used twenty-nine different times in Chapters I and IV, Volume I, of the USAF Personnel Plan. These terms invariably are associated with more responsibility which translates into advancement in grade or into managerial positions. One of the purposes of grades is expressed to be: ". . . to help provide the highest possible level of motivation [8:p.4-8]." The system does not acknowledge the fact that some very good technicians may be motivated by being technicians and taking them away from their technician duties may lessen their job satisfaction, motivation, or morale. Pay and managerial advancement is the focus of career progression in the enlisted force.

The concern of the system with rewarding only managers may be related to concept 2, which envisions a flexible force. Because of the nature of the force, part careerists and part first-termers, management considerations are obviously of great importance. However, the requirement that every noncommissioned officer must gradually become a manager, to be able to advance, is applied uniformly to all career fields. This may work well in some career fields.

However, in career fields dealing with high technology, a less than overabundant supply of manpower, and where competition exists with private industry for that manpower, maybe a review of present strategy would lead to a more effective alternative.

The Air Force pays dearly to train technicians. Every good technician lost represents a drain on operational capability and funds to train a replacement. If those technicians were kept in the system, the savings resulting from the reduced training load could be used in other areas. The loss of technicians by the Air Force does benefit one group. It benefits civilian employers with a more flexible personnel system which rewards technicians.

Summary

The Air Force personnel policy of maintaining a well trained force with the ability to adapt to requirements is sound. The personnel management philosophy founded on the Total Force Policy, the Personnel Life Cycle approach, and Management by Objectives appears to be an effective strategy based on sound management practices. However, there seems to be a certain degree of incompatibility in the personnel system objectives because it applies one policy uniformly to over three hundred occupations. The system wants a flexible force but there is no flexibility in the system itself. By maintaining a structured force which can only progress into management positions, the personnel system conflicts with its objective of a motivated force, for those members who simply want to remain technicians. With demand for technicians increasing and recruiting pools shrinking, this weakness in the system must be corrected.

CHAPTER IV

TOPCAP MODELS AND CAREER RETENTION ANALYSIS

Introduction

This chapter describes the TOPCAP model operations in detail. The authors have analyzed the TOPCAP model structure and compared TOPCAP retention targets with the current enlisted inventory in several highly technical career fields, the Logistics career fields (all AFSCs combined), the Maintenance career fields (all AFSCs combined), and the total Air Force enlisted inventory to determine whether TOPCAP objectives are being met. The following questions were addressed:

1. What are the models on which TOPCAP is based and how do they work?

2. The objectives of the Air Force personnel system with regard to enlisted force manning may be viewed as: insuring that the right quantity and mix of personnel resources is available to accomplish those tasks normally assigned the enlisted force. If the system is losing people, especially in critical areas, is something wrong with the system?

3. Is the current enlisted force structure compatible with the configuration needed to arrive at the desirable distribution of grades for the objective force?

No attempt has been made to describe the TOPCAP Centralized Promotion System overall, as the system was covered in Chapter 4 of the thesis by Francis J. Hall and Captain Clark K. Nelsen (LSSR 53-80) titled "A Historical Perspective of the United States Air Force Enlisted Personnel Promotion Policy (1947-1980)" (13:60). Instead, the authors describe the models associated with TOPCAP and analyze the output. This analysis was useful in examining the realization of the TOPCAP objectives. The past and present retention rates were analyzed using statistical methods described in Appendix B of this thesis. Finally, the chapter discussed the present career progression system and TOPCAP.

Force Structure and the TOPCAP Models

The airman force is typically managed by force structure and grade structure. Force structure refers to the total inventory of airmen classified by the year of service (YOS). Career force profiles are developed in the Directorate of Personnel Plans (MPX), Headquarters USAF, for approximately 120 career progression groups (CPG) (grouping of occupational specialties) as well as for the total force (3:13). Force structure planning was developed primarily to control personnel costs. The structure is managed through procurement and separations. The two principal factors affecting the shape of the enlisted force are the numbers of nonprior-service (NPS) airmen procured to meet authorized end-strengths, and the annual rate of first-term airman reenlistments into the career force (3:13).

The total enlisted personnel force is developed beginning from a "career structure." The TOPCAP models are designed to develop a career force size to meet the skill requirements by controlling the flow of airmen in skill levels 7 and 9. Retention of airmen is very important (3:13). The provision of leadership and pay structure within the determined skill level structure is accomplished by grade-level requirements. The grade structure is a function of manpower requirements, pay-grade ratio ceilings, skill-level upgrade rates, and promotion policy. Force and grade structure management can be called the control of the stock of airmen in order to provide promotion opportunity within budgeting and manpower constraints (3:16).

The primary purpose of TOPCAP is to establish the means for developing an enlisted force that has the proper experience and skills to meet manpower requirements.

> The objective force structure, the "Christmas Tree" graph shown in Figure 4-1, is based on manpower requirements by required skill levels (not funded ceilings). It shows the number of skilled personnel (journeymen or 5 levels and superintendents/supervisors or 7, 9 levels) required in each year group (5th through 30th year). To determine our personnel needs by each year group, historical loss rates and skill upgrade rates

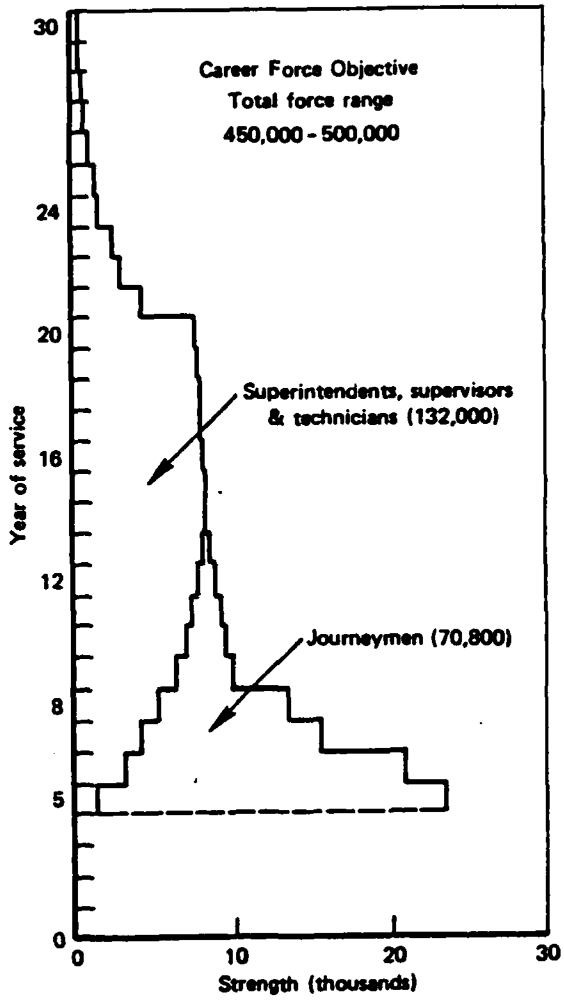


Fig. 4-1. TOPCAP Career Force Structure (9:C-5)

<u>Notes</u>:

1. Population Total Active Federal Military Service (TAFMS): 5-30 years--202,000 (45%), 7-30 years--156,500.

2. This figure depicts the current (goal year 1987) career force objective. For a force range of 450,000 to 500,000, 210,000 career NCOs are required. The optimum mix of experienced career NCOs to first-term airmen is 45 perce to 55 percent.

are considered. The TOPCAP model provides us with enlisted force objectives. The models serve as templates for personnel management and programs like reenlistments and retraining and are geared to achieving the proper mix of career people in each occupational grouping. It is important to emphasize that the objective career force is geared to meeting skill level requirements. The plan assures there is a proper supply of NCOs possessing the needed skills and experience as reflected by their primary AFSCs to meet the demand of manpower skill level requirements [14].

Success in achieving the TOPCAP objective is dependent on an orderly transition of the enlisted force toward the objective. This orderly transition depends on the smooth flow of the TOPCAP computerized management system. The conceptual description of the TOPCAP computerized management system employed in planning, programming, and force management is included in this chapter. A description of the interfaces between the models, as well as a description of the models themselves, is also presented. The functions of the computer models are summarized as follows (10:F-1):

1. Skill Projection Model--provides manpower authorizations.

2. Objective Force Model--develops an objective career force by skill level and years in service.

3. Airman Force Steady State Model--allocates grades to the objective force.

4. Promotion Flow Model--transitions the objective force toward TOPCAP.

5. Airman Skill Force Model--applies TOPCAP to the objective force program by skill.

6. Airman Force Program and Longevity Model--develops and projects future force and budget.

7. TOPCAP Grade Structure Model--determines the optimum grade structure to meet skill level authorizations.

The interface between these models is explained by following the methodology used in formulating the current TOPCAP objective career force of 202,800 career airmen. The TOPCAP computerized information system is illustrated in Figure 1-1 of Chapter I. A total force range of 450,000 to 500,000 was selected in the TOPCAP update to accommodate projected strengths. This career force contains a sufficient number of superintendents, supervisors, and technicians in the active inventory to support the upper limit of the force range (500,000). The lower limit of the force range (450,000) represents the minimum number of airmen who can be authorized without a TOPCAP structure change (10:F-1).

Skill Projection Model

The Skill Projection Model changes the fiscal year end strengths into requirements for airman skills. The 7 and 9 skill level authorizations are extracted from this model (Figure 4-2). These authorizations are augmented by the minimum number of career journeymen (5 levels) required to sustain the 7 and 9 skill level requirements. The time required to upgrade to the 7 skill level and the attrition

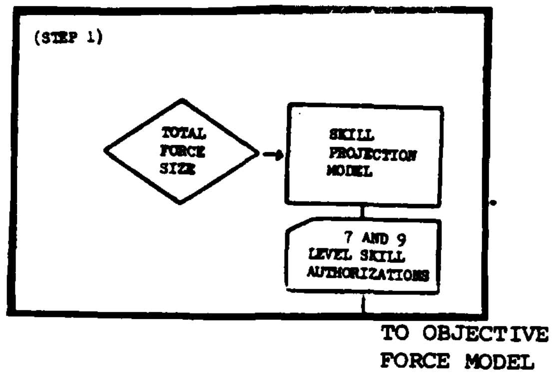


Fig. 4-2. Skill Projection Model (9:F-6)

rate of the 7 and 9 levels is needed to determine the 5 level career force. This information is obtained from the Uniform Airman Record (UAR) file by finding the date of entry into service and the date of upgrade to the 7 level for each Career Field Subdivision (CFS) (Figure 4-3). Loss rates are achieved through probabilistic approaches based on analysis of historical data in the UAR (10:F-1).

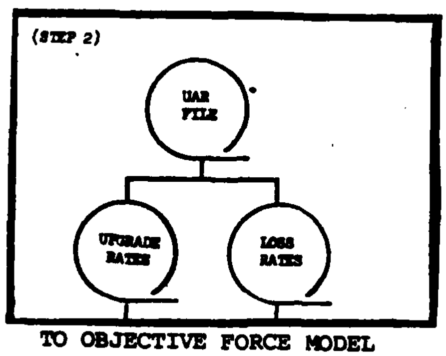
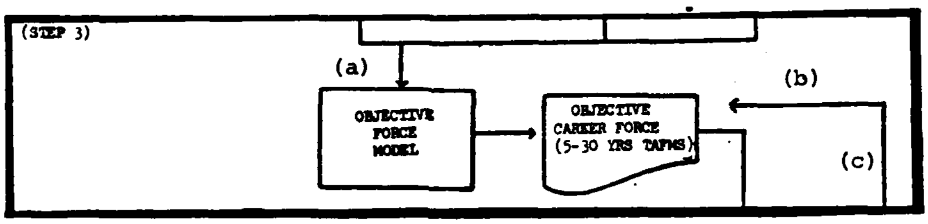


Fig. 4-3. Upgrade/Loss Model (19:F-6)

Prior to the Skill Projection Model (SPM), personnel used HAF-D10 manpower data together with projected inventory and attrition data. It required three to six months from fiscal year impact to be utilized and then required nine to fourteen months for a given fiscal year change to work itself fully through the manpower/personnel programming system. The SPM replaces this prolonged obsolete method. The SPM is a computer program which forecasts distributions of authorized strengths for planned operations (represented in the Five-Year Defense Plan) (FYDP) in accordance with past patterns. These forecasts are treated as manpower requirements, for purposes of personnel planning and programming, and are used as part of the manpower-requirements/personnel objectives subsystem and also as part of the authorization/assignment subsystem (2:43). The SPM takes the latest FYDP requirements for airman skills and forecasts the impact on skill levels in Air Force Specialty Codes (AFSC). This provides an Air Force-wide projection of requirements by AFSC, suffix, skill level, and grade every four years. The outputs of the program and model are used for developing personnel programs, as well as developing the 7 and 9 level skill requirements inputs used by the Objective Force Model.

Objective Force Model

The Objective Force Model (OFM) determines the number of career 5 levels needed and distributes the force by years of service. The output of this model is an objective career force distribution (5-30 years TAFMS) of personnel, by career progression groups, showing the numbers required in each year of service (Figure 4-4) (10:F-1).



(a) INPUT FROM SKILL PROJECTION MODEL AND UAR FILE
(b) FEEDBACK FROM PROMOTION FLOW MODEL AND REALISTIC OBJECTIVE
(c) TO CAREER FORCE CONFIGURATION

Fig. 4-4. Objective Force Model (9:F-6)

The target force structure for career personnel (Figure 4-5) is the sort of objective structure determined by utilizing the Objective Force Model for each of the career progression groups and then aggregating the total (2:41). The input from the SPM defines a system of simultaneous linear equations which the Objective Force Model solves to determine the number of skill level 5 personnel needed in the career force. In doing so, the model ignores the SPM's specifications for required manpower at skill levels 1, 3, and 5 (2:43). Key input and output factors of the OFM are

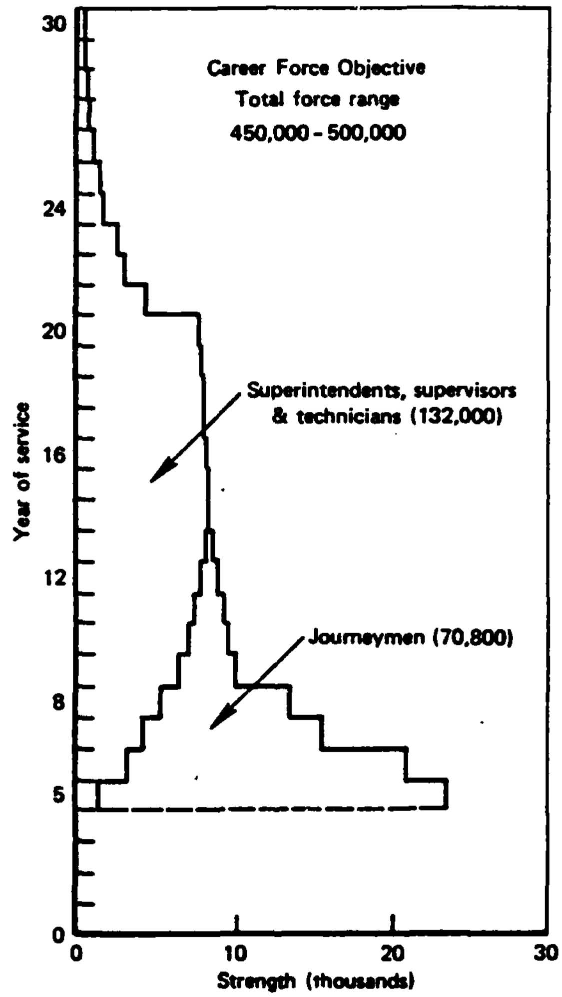


Fig. 4-5. Example Objective Career Force Structure (9:C-5)

presented in Figure 4-6. The model may run using Career Field Subdivisions or Career Progression Groups. The OFM methodology used is illustrated by this example (10:F-3): a particular CFS is assumed to have a requirement of 1000, 7 level and 9 level positions. These positions are spread in a distribution according to year groups of service by using upgrade rates and loss rates. In this methodology, year 6 is the first year in which a percentage of the CFS is upgraded to the 7 level. Only E-5 upgrades are used in an attempt to eliminate bias from cross-training (Figure 4-7(a)). In each of the succeeding years, those upgrading are added to the previous year's percentages of upgrade until the total upgrade percentage approximates 100 percent (Figure 4-7(b)). This becomes the theoretical 100 percent upgrade year group. Based on historical upgrade factors, this is the year of service in which all the airmen in the particular CFS have theoretically been upgraded to the 7 level or have left the service. Using this method, a fifteenth year mark has been established with the relative slope or upgrade profile desired.

The right side of the distribution is described by the loss rates of the applicable CFS (Figure 4-7(c)). In this example, at the fifteenth year, 100 percent has been achieved as stated above. From this point, the only action that can affect the shape of the distribution is attrition.

INPUT

Total force size
7 & 9 skill level authorizations
7 skill level upgrade rates
Loss rates by AFSC and year group

Distributes 7 & 9 skill level
Authorizations by TAFMS

Determines 5 skill level requirements
to support 7 skill level upgrades
& 7 & 9 skill level losses

OUTPUT

Number required in each CPG by TAFMS
Reenlistment objectives by CPG
Minimum NPS procurement level
Objective profile for career force
Similar data for each CPG

Fig. 4-6. Objective Force Program (9:F-6)

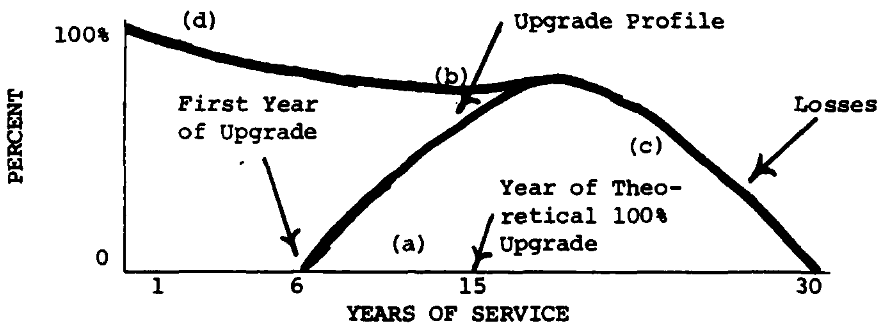


Fig. 4-7. Objective Force Model Curve (9:F-3)

This effect can be quantified by successively deducting the loss percentage from the previous year, starting with the loss rate in the sixteenth year group from the 100 percent at the fifteenth year. This exercise is repeated until the thirtieth year group is reached and the right-hand side of the distribution has been defined.

The 1000, 7 and 9 levels, positions must now be fitted in the CFS. The percentages of upgrades and losses for each year group are added and divided into 1.0 and a ratio is developed that can be multiplied by the percentages of the upgrades or losses and by 1000 to give an actual population for each group. The total of these year groups will equal 1000. The formulas used are:

$$\frac{1.0}{\text{Total \% Upgrade and Loss}} = \text{Ratio}$$

$$\text{Ratio X Year Group Percentage X 1000} = \text{Actual CFS Population}$$

The population of each year group within the CFS is determined using the following formula and the thirtieth year group as a base:

$$\text{29th Year Group Population} = \frac{\text{30th Year Population}}{\text{1.0 - 29th Year Loss Rate}}$$

Each year group population is successively determined back to the first year group (example):

$$\text{29th Year Group Population} = \frac{\text{30th (20, Airmen)}}{\text{1.0 - 29th Year Loss Rate of 8\%}}$$

$$\text{29th Year Group Population} = 21.7 \approx 22 \text{ Airmen}$$

A profile for this particular CFS is developed and is translated into absolute number for each year group (twenty-two airmen for the twenty-ninth year group) (Figure 4-7(d)). The model then continues in this manner to produce an objective force for each CFS. By combining requirements in each CFS, a total objective force structure is also produced (Figure 4-5).

Airman Force Steady State Model

The career objective force structure is further refined into a grade structure and extended to include first term airmen using the Airman Force Steady State Model (AFSSM) (Figure 4-8) (2:43). This model also has an internal structure which solves simultaneous linear equations. Its purpose is to determine promotion policies to be applied for the enlisted force as a whole, rather than for individual CFS. This is the only model that acknowledges costs explicitly. Its output may (optionally) include cost estimates for training, procurement, maintenance, retirement, etc. (2:63). This capability has been added to the primary use and is apparently little used. This model's primary use is total force planning and such

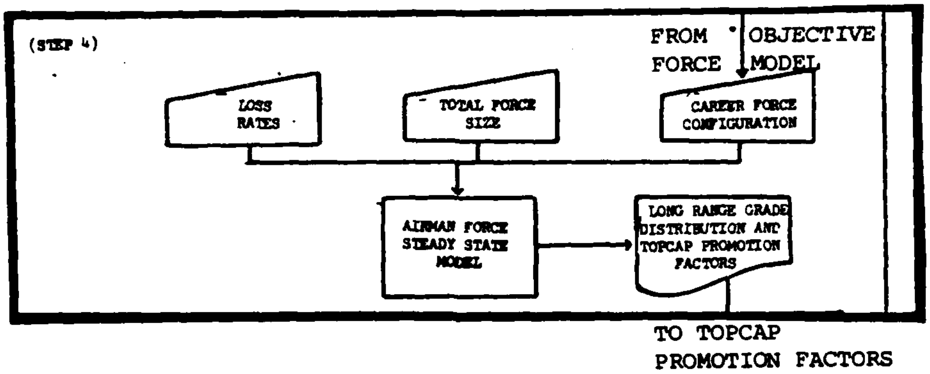


Fig. 4-8. Airman Force Steady State Model (9:F-6)

cost data is not career specific; thus, it is rarely used in the model (2:63). The AFSSM builds optimum grade structures for each year group based on TOPCAP promotion opportunities (Figure 4-9). The output of this model is the best long-range grade distribution by years of service. The AFSSM uses skill levels instead of grades. The primary output of this model provides data from which a grade structure can be displayed based on years of total active military service, from one to thirty, with the strength of each year group indicated (Figure 4-10). In the design of the AFSSM, certain characteristics of the airman force are used. A particular grade can be entered only from a next lower grade. The model is based on the idea that the number of airmen in a grade, in a certain year, is equal to the number of airmen remaining from the previous year less the losses due to attrition from the service and promotion

INPUT

Continuation rates by year group
Skill upgrade data
Career force configuration
Career force minimums
Reenlistments

High years of grade tenure
Low years of grade tenure
Years of promotion consideration
Percentages of promotion probability
Grade E-9 strength

Basic pay and allowances
Procurement costs
Basic/technical training costs
Retirement costs

OUTPUT

Force & grade configuration
Force component mix
Procurement
Promotions
Retirements
Force attrition
Grade requirements

Total system cost
Cost per productive manyears
Average years service by grade
Average years service at promotion

Fig. 4-9. Airman Force Steady State Program (9:F-8)

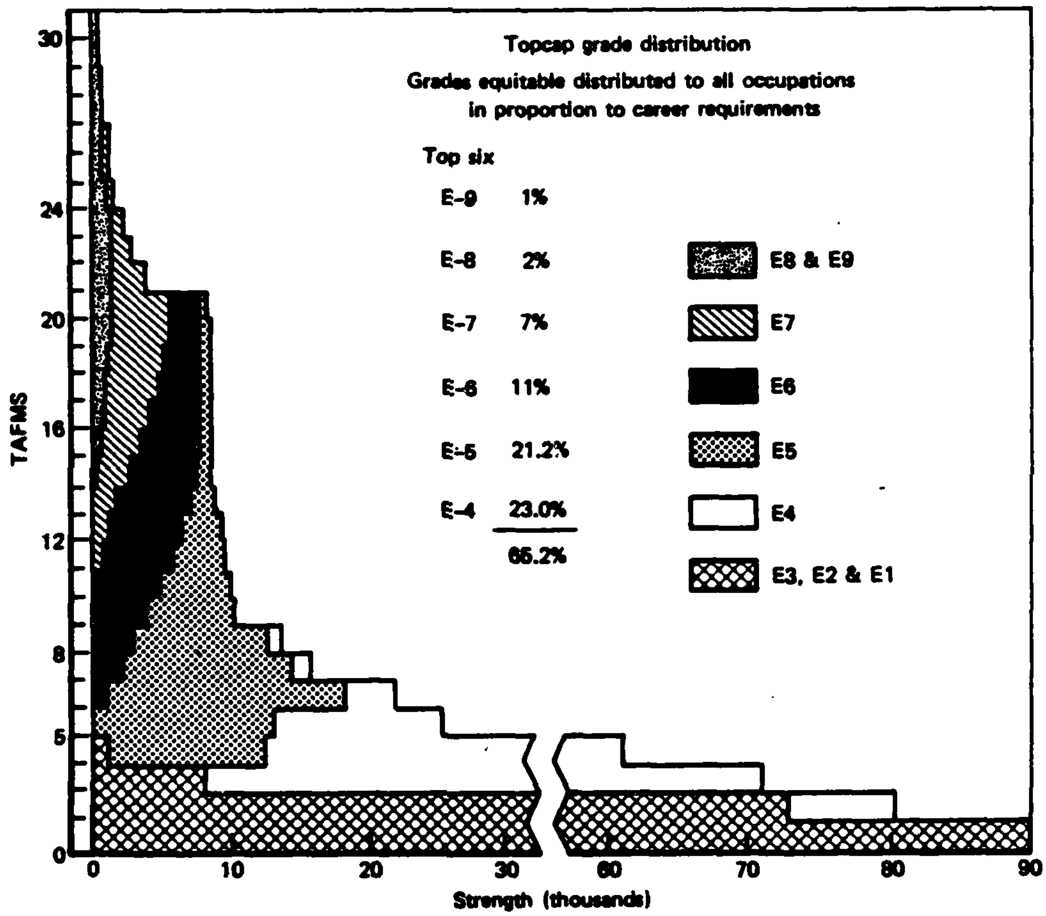


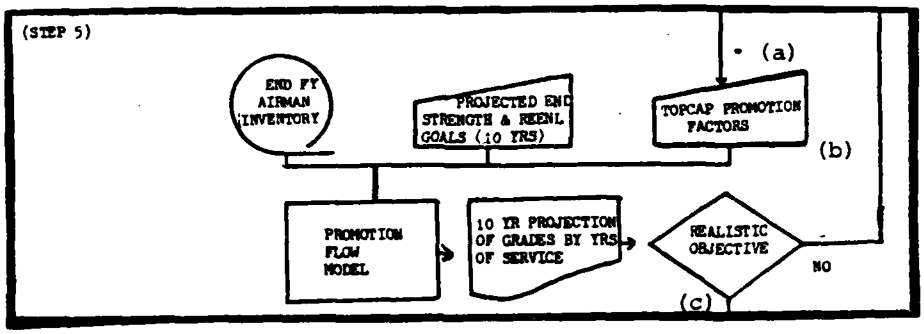
Fig.4-10. Example Objective Grade Structure (9:D-10)

from the grade, plus promotions to the grade, during that year (10:F-4).

Both the OFM and AFSSM are "static" models; they derive force structures which are invariant from year to year. They take no account of presently or likely available manpower resources. The promotion policies should "drive" the current force structure toward the stationary or static structure, provided historical loss and upgrade rates persist (2:44). The AFSSM does allow different retention rates for airmen in the same year of service who hold different pay grades. Thus, the model does incorporate some of the influence of promotion policy on retention. But, effects such as increased "pull" of lowered phase points (i.e., expectations of faster promotions among junior airmen, whose retention rates should increase) are not considered (2:60).

Promotion Flow Model

Because today's force is not at the objective configuration, the promotion opportunities and TOPCAP policies are tested to see if they direct the force toward the objective configuration. To accomplish this, the current inventory by years of service, grade, projected end strengths, projected promotion data, and projected policy constraints are inserted into the Promotion Flow Model (PFM) (Figure 4-11). Those anomalies which may occur during



(a) FROM AFSSM
(b) BACK TO OBJECTIVE FORCE MODEL
(c) TO OBJECT CAREER FORCE

Fig. 4-11. Promotion Flow Model (9:F-6)

the transition from the current structure to the static objective structure are identified using this model. This is a "dynamic" model, consisting of a mechanism for sequential matrix multiplication (2:44).

The PFM is a testing and managerial tool model that reflects the effect of current policies and policies needed to be implemented for correction. The output of this model is a ten-year simulation of the force and grade structure.

The PFM program (Figure 4-12) simulates the changing structure of the force through time. Its logic is designed to complement the AFSSM and age a beginning inventory using a given choice of policy options. The selected output can be: (1) number of airmen by years of service and grade for any future year, (2) number of promotions expected to be provided by years of service and

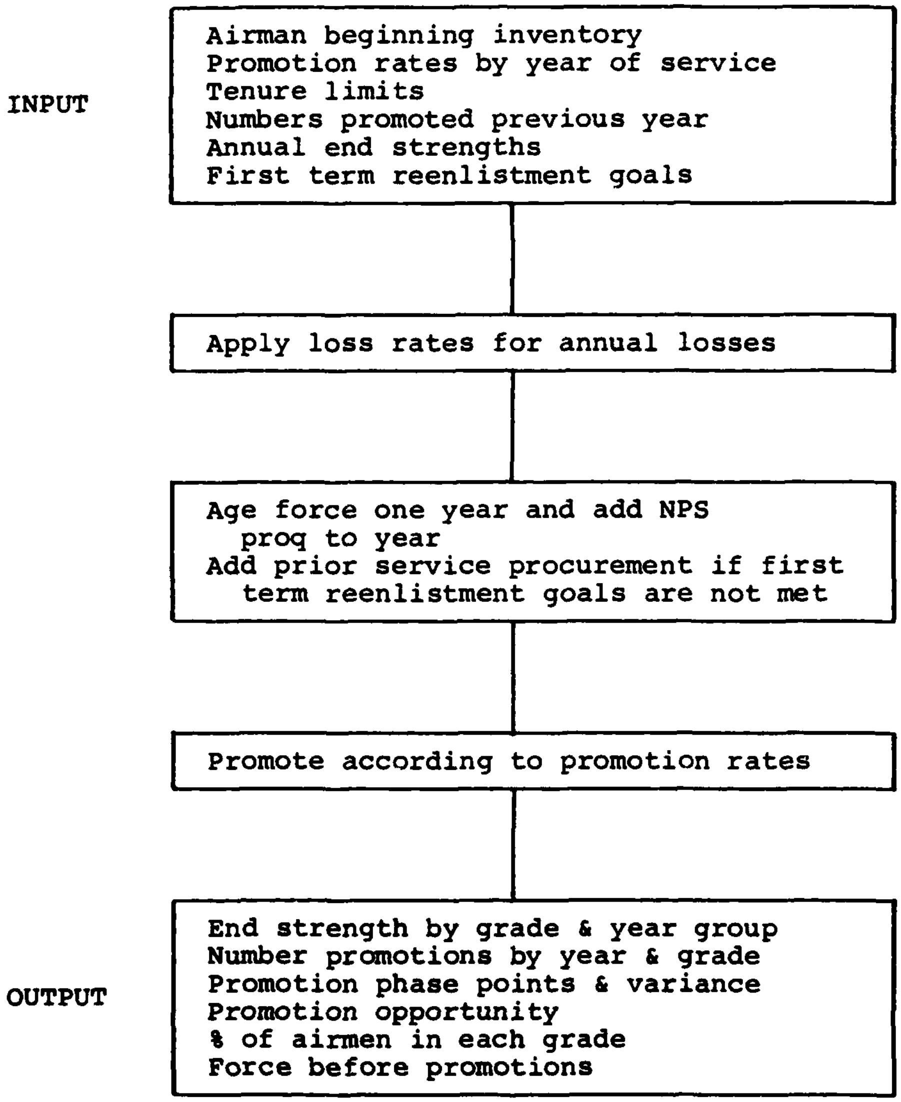


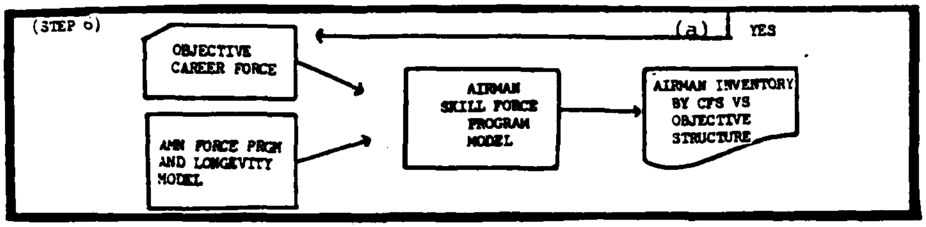
Fig. 4-12. Promotion Flow Program (9:F-9)

grade for any future year, (2) number of promotions expected to be provided by years of service and grade, (3) the average variance of service at promotion, (4) promotion opportunity, (5) proportion of airmen in each grade for future years, and (6) the attrited force before promotions. Most of the input data must be specified in dimensions of years of service and grade. Required inputs include beginning force inventory, promotion rates by year of service, annual end strengths, fifth/seventh year target populations, and number of airmen promoted the previous year. The primary use of this model arises from the need to simulate airman force dynamics in advance of any policy change (10:F-4).

The attrition and promotion steps are normally accomplished by multiplying the appropriate force structure matrices by matrices of loss rates and promotion rates, respectively. (The promotion rate matrix is determined by the AFSSM.) "Unreasonable" projections such as years with high accession requirements are noted and referred to the policy planners. Possible results include policy revisions and subsequent reexercising of the static and dynamic models (the feedback loop in Figure 1-1) (2:46). The PFM's main use is found in considering the force as a whole, neglecting specific occupational needs. The mode has little flexibility for considering changes in programs, technologies, behavioral patterns, etc. The mode also has no capability for controlling force evolution; i.e., by recommending retention incentives or enlisting more airmen during years of "easy" personnel supply. In times past, policies seem to have been sought as quickly as possible to remedy the above problem and usually created more problems (3:62).

Airman Skill Force Model

A number of other special-purpose models transform the overall objective force structure and promotion policy into objectives and guidelines for individual career progression groups, on the basis of historical loss rates peculiar to airmen in those groups. These CPG specific objectives eventually constitute inputs to the Airman Skill Force Model (ASFM) (Figure 4-13) within the authorization/assignment subsystem. This model further refines the objective force by taking into consideration lateral movement by career field ladder. The ASFM projects strength by AFSC for four years and provides programmers and planners various products. The model compares current and projected manpower supplies against anticipated manpower requirements and helps to determine the need for personnel recruitment, training, and cross-training (2:46). The model also evaluates progress toward TOPCAP objectives and is the management tool used for airman programming actions.



(a) FROM 10 YEAR PROJECTION OF GRADES BY YEARS OF SERVICE

Fig. 4-13. Airman Skill Force Program Model/ Airman Force Program and Longevity Model

The ASFM projections are based on the UAR, data from the Airman Force Program and Longevity Model (AFPL), and a manpower authorization file provided by the ASPM (Figure 4-14). The ASFM provides personnel programmers with Trained Personnel Requirements (TPR) as well as budgeting information.

Airman Force Program and Longevity Model

The Airman Force Program and Longevity Model (AFP&LM) produces the official Airman Force program. It is designed to project changes in airman strength totals by grade and years of total military service, and provides approximately twenty-five transaction categories for the current operating year, the upcoming budget year, and eight additional planning years (Figure 4-15). Output reports are used as the basis for requesting funds from Congress and to provide tracking information needed to remain within budget and manpower authorizations. The AFP&LM also provides the total and monthly phasing, by grade, of

INPUT

UAR strength
Authorizations
Loss rates
EOS rates
Procurement, promotion quotas
Retraining transactions
AFSC control file
Career 5-level requirements

Current force is aged using loss, EOS, upgrade rates; AFSC conversions and lateralling actions
Retraining data
Produces projections for current, budget, and 2 planning years

OUTPUT

Trained personnel requirements for ATC (TPR)
Strength print (projected data)
Optimum force profiles
Retraining advisory (excesses & overages)

Fig. 4-14. Airman Skill Force Program (9:F-10)

INPUT

Attrition rates
Grade limitation as a % of total force
Reenlistment rates
Desired prior service and WAF procurement
OSD approved end strengths and MYA
Controls for starting month, selection of options, etc.
Latest reported strength and transaction information

Apply loss rates for each loss category
Determine career/1st term reenlistments
Calculate monthly strength without NPS and determine difference from approved end strengths
Distribute NPS procurement within MYA limitation
Calculate promotions within % limitations
Age force by FY and grade/MYA into pay steps

OUTPUT

Spread sheets by years service, grade, and gain/loss category
Comparison of programmed versus reported
Total count by individual ACN and SDN code
Projected FY force by MYA and pay category
Dependent data
Retirement data
Entitlement to terminal leave pay data
Information for determination of recruiting and promotion quotas

Fig. 4-15. Airman Force Program and Longevity Program (9:F-11) projected promotion quotas and recruiting quotas. Tables are also constructed to provide budget estimates by man-year averages, for base pay and allowances (10:F-4).

TOPCAP Grade Structure Model

The TOPCAP Grade Structure Model (TOPGRADE) (Figure 4-16) provides the personnel manager with optimal skill level/grade structures (by AFSC, CFS or CPG) consistent with TOPCAP objectives. The simulation is unique because it employs the CPG as the nucleus processing unit. AFSCs (regardless of CFS) are grouped into clusters that have meaning in terms of career progression. The simulation model then operates against the unit aggregate. The results are distributed via a pro rata scheme back to the desired management unit (AFSC, CFS). This allows the manager to evaluate the impact of proposed policy decisions on career progression. The resultant approved grade structure is provided to manpower to use as a guideline for grade alignment of authorizations by AFSC (10:F-5).

Retention and the Present Career Force Configuration

As stated many times in the models' methodology, retention percentages play an important part in the objective career force. It is important to remember that TOPCAP is applicable only to a force that is ideally structured. The current enlisted inventory varies significantly from

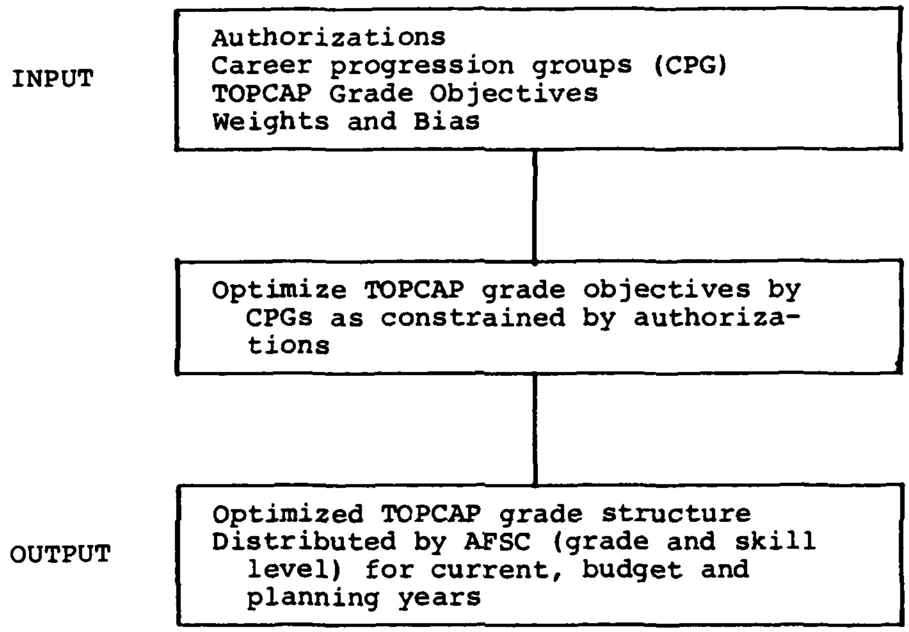


Fig. 4-16. TOPCAP Grade Structure Model (9:F-12)

the TOPCAP objective structure (9:p.3-1). The changes that must occur to transition the force into the optimal objective structure have both annual and long-range implications for management.

The first term force is the major variable of the total force. Under TOPCAP, the fluctuation of airmen requirements is predominantly for first term airmen at the journeyman skill level. A major criterion for the first term force is that a sufficient number of high quality, nonprior service airmen be procured annually to provide an adequate resource four to six years later (9:p.3-2). There can be major problems in the TOPCAP objective structure should the quantity of second term and career airmen fluctuate to great extremes. The TOPCAP force is divided into two major components based on enlistment and years of completed active service. Airmen with less than four years of active service or those on their first enlistment are considered first term airmen and those airmen having over four years who are serving on their second or subsequent enlistment are considered as career airmen (9:p.1-1).

Introduction

This section will evaluate the present condition of the career force using retention rates. Six technical/maintenance AFSCs (Table 1-1) were chosen to be evaluated along with the total Air Force retention, logistics career fields retention, and total maintenance retention.

The logistics field consists of: Missile/Electronic Maintenance, Avionics Maintenance, Maintenance Management Systems, Aircraft System Maintenance, Aircraft Maintenance, Missile Maintenance, Munitions/Weapon Maintenance, Vehicle Maintenance, Transportation, Services, Fuels, and Logistics Plans. The maintenance field consists of: Avionics Systems, Aircraft Systems Maintenance, Aircraft Maintenance, and Munitions/Weapon Maintenance (14). In a study conducted by the Air Force Human Resources Laboratory titled Air Force Enlisted Personnel Retention--Accession Model, a conclusion about the Air Force Enlisted Personnel Market stated:

> The analysis presented, makes it clear that the accession market and the retention market are intertwined. There is a significant amount of feedback in both directions. Obviously, the number of accessions influences the gross number of first termers available for reenlistment. Less obvious is the impact of Air Force pay scales for second term individuals on the rate of new accessions. The effect of the Air Force's desired experience composition of the enlisted force also impacts on both the retention and accession markets in a non-trivial way [25:15].

The following definitions and equations were used in the discussion and analysis of current enlisted reenlistment and retention trends:

Definitions

1. First term reenlistment--the time when a first term airman reenlists for a second term (four years) and the action which extends the airman beyond his initial four or six year commitment.

2. Second term reenlistment--the time when a second term airman (five to ten years) reenlists for a third term (nine to eleven years) and extends his service beyond the second term commitment.

3. Career reenlistment--the time when a third or consequent term airman reenlists for another term.

4. First term retention--that number of first term airmen retained for their second enlistment.

5. Second term retention--that number of second term airmen retained for their third enlistment.

6. Career retention--that number of third and subsequent term airmen retained for their next enlistment.

Equations

$$\text{Reenlistment Rate} = \frac{\text{Reenlistments}}{\text{Eligibles}} \tag{14}$$

$$\text{Retention Rate} = \frac{\text{Reenlistments}}{\text{Total Separations}}$$

<u>Example</u>:

<u>Separations</u> (Total 500)

- Ineligibles 100
  1) Tenure
  2) Premature
  3) Discipline, etc.
- Eligibles 400
  Reenlistments 300

$$\text{Reenlistment Rate} = \frac{300}{400} = 75\%$$

$$\text{Retention Rate} = \frac{300}{500} = 60\%$$

Note: Numbers are hypothetical.

<u>Statistical Analysis</u>

The reenlistment/retention information in Appendix C was used as the data base for the statistical analysis. The problem of retention rates can become a serious problem as shown in Table 4-1. These charts capture the relationship between grade ceilings, skill requirements, and skill inventories (based on awarded primary AFSCs). The "Grade Ceiling" column in Table 4-1 indicates the number of stripes available in the enlisted force because of Congressional and Office of the Secretary of Defense (OSD) constraints. Assuming "two grades per skill" to be the optimum grade-skill relationship, a comparison of these two columns shows how many grades the Air Force is short due to funding constraints. For example, the Air Force needs nearly 22,000 CMGSTS and SMSGTS, but can only have about 14,000. However, the "Skill Inventory" column shows

TABLE 4-1

ENLISTED FORCE OVERVIEW--460,000 (14)
(Skill-Grade Requirement/Inventory/Ceiling Linkage)

Grade	Skill	Grade Ceiling	Skill Requirement	Skill Inventory
CMS	CEM			
SMS	9	3% 13,800	5% 21,700	7% 31,500
MSG	7	18%/85,900	24%/109,000	
TSG	7	(21%/99,600)	(29%)/130,700)	31%/140,000
SSG	5	44%/205,500		(38%/171,900)
SGT	5	(65%/305,100)	50%/230,800 (79%/361,500)	45%/207,700 (83%/379,600)
A1C & BELOW	3& BELOW	35%	21%	17%

that the Air Force does have a sufficient resource of skilled NCOs to meet this requirement. Example, there are about 17,000 MSGTS who hold the 9 level primary AFSC. A key point is that the numbers shown in Table 4-1 remain the same regardless of whether the use of "two grades per skill" or "three grades per skill" assignment policy is used--same grade ceilings, same requirements, same skilled resources. Under the "two grades per skill," manning is by grade to the maximum extent as possible. Local Commanders can choose personnel to be used in the higher skilled positions from the available resource of lower ranking but qualified NCOs (14). Table 4-2 shows the same information for the Logistics force.

TABLE 4-2

LOGISTICS ENLISTED FORCE--180,000 (14)
(Skill/Grade/Inventory Linkage)

Grade	Skill	Grades Authorized	Skill Requirement	Skill Inventory
CMS	CEM	3% 5400	4% 7600	6% 12,000
SMS	9			
MSG	7	18%/32,400	23%/38,900	30%/58,400
TSG	7	(21%/37,800)	(27%/46,500)	(36%/74,000)
SSG	5	47%/84,600	54%/91,900	48%/95,500
SGT	5	(68%/122,400)	(81%/138,400)	(84%/165,900)
A1C & BELOW	3 & BELOW	32%	19%	16%

Although the authorization numbers in these tables may stay the same, retention rates can cause many problems in meeting the authorizations. If the Air Force does not have the number of career NCOs, then the skill level/ grade distribution will not be the most efficient structure to follow.

The analysis is broken down into four steps as follows:

Step 1. Organize data into usable information.

Step 2. Validate and/or relate the data.

Step 3. Compare data statistics with present policy needs.

Step 4. Project trends in the future.

Data Organization. The authors develop these four steps below; each step contributes to the analysis and statistical evaluation of the force structure.

1. Step 1. The data in Appendix C, and from Headquarters USAF, Washington, D.C., was reviewed and sorted using the SPSS subprograms called CROSSTABS and CONDESCRIPTIVE (5) (see Appendix B for detail operations). The output of these packages are shown in Tables 4-3 and 4-4. Table 4-3 contains reenlistment rates for the six AFSCs, Logistics, Maintenance, and Air Force. Table 4-4 contains the retention rates for the above groups. These descriptive-type statistics can be used for comparisons. The reenlistment rates were reviewed and showed no major deviations. Since the reenlistment rates were not the statistics needed for this analysis, no further investigation of those data was pursued by the authors.

The retention rates shown in Table 4-4 were reviewed and then plotted on graphs (Figures 4-17, 4-18, 4-19, and 4-20) to detect any trends that might have occurred. The first term retention rates, Figure 4-17, show no significant trends and do not deviate from the Air Force average. It is interesting to note that during

TABLE 4-3

REENLISTMENT TOTALS (%)

	304X0			316X0			326X0			423X0			461X0			511X0		
	GP 1			GP 2			GP 3			GP 4			GP 5			GP 6		
YEARS	1	2	C	1	2	C	1	2	C	1	2	C	1	2	C	1	2	C
73	17	76	97	25	66	98	100	67	95	15	79	98	20	74	97	24	83	99
74	23	76	96	33	74	100	48	100	93	24	84	96	15	72	96	40	77	97
75	32	73	98	47	63	99	45	55	100	35	78	99	32	72	94	42	73	95
76	26	77	92	31	54	94	60	57	94	37	81	88	42	74	94	29	63	88
77	19	67	94	20	64	90	25	51	97	43	82	96	59	80	97	40	52	91
78	32	56	95	37	45	81	29	50	90	34	66	94	37	78	97	70	58	93
79	31	52	93	39	48	88	23	44	87	31	66	91	29	72	94	60	62	84
80	34	67	93	25	56	82	15	75	76	26	61	89	37	67	94	50	61	88

See Legend, next page.

TABLE 4-3--Continued

YEARS	6 Group Averages			AF			LOG			MAINT		
	1	2	C	1	2	C	1	2	C	1	2	C
73	34	74	97	32	75	95	32	74	96	33	71	97
74	31	81	96	34	80	94	31	79	90	30	75	93
75	39	69	98	40	75	97	31	68	97	28	69	96
76	38	68	92	37	68	92	36	65	91	34	64	92
77	34	66	94	39	69	95	37	66	93	37	66	92
78	34	59	92	41	65	93	35	63	95	33	65	97
79	36	57	90	38	60	91	34	61	90	33	64	89
80	31	65	87	35	67	93	31	64	98	28	62	94

1 = First Term
2 = Second Term
C = Career Group
AF = Total Air Force
LOG = Logistics Fields
MAINT = Maintenance Fields

TABLE 4-4

RETENTION AVERAGES (%)

	304X0			316X0			326X0			423X0			461X0			511X0		
	GP 1			GP 2			GP 3			GP 4			GP 5			GP 6		
YEARS	1	2	C	1	2	C	1	2	C	1	2	C	1	2	C	1	2	C
73	13	33	71	21	61	64	25	60	71	12	65	66	17	59	63	20	67	74
74	16	68	66	23	70	53	31	100	54	16	60	48	12	56	60	31	65	66
75	19	63	65	28	56	49	25	46	52	19	64	44	18	64	54	33	63	58
76	16	71	70	20	50	60	29	57	65	20	75	53	26	67	62	20	58	64
77	13	63	65	13	58	65	15	53	74	25	73	54	33	72	71	28	46	62
78	17	50	71	21	39	63	16	44	73	18	57	54	21	65	68	22	52	64
79	22	44	71	27	47	66	16	40	57	20	59	74	17	65	63	50	56	62
80	22	59	65	19	54	59	13	75	47	18	57	69	20	61	70	39	53	60

See Legend, next page.

TABLE 4-4--Continued

	6 Group Average			AF			LOG			MAINT		
YEARS	1	2	C	1	2	C	1	2	C	1	2	C
73	18	58	68	20	60	69	17	61	65	18	62	66
74	22	70	58	22	65	66	25	66	68	23	64	67
75	24	59	54	20	64	55	23	64	54	22	67	51
76	22	63	62	21	62	61	20	58	58	19	61	59
77	21	61	65	21	60	63	20	61	62	19	60	62
78	19	51	66	20	58	62	21	55	61	22	57	62
79	25	52	66	22	53	62	25	53	62	24	51	62
80	22	60	62	23	62	72	22	59	73	20	58	74

1 = First Term
2 = Second Term
C = Career Group
AF = Total Air Force
LOG = Logistics Fields
MAINT = Maintenance Fields

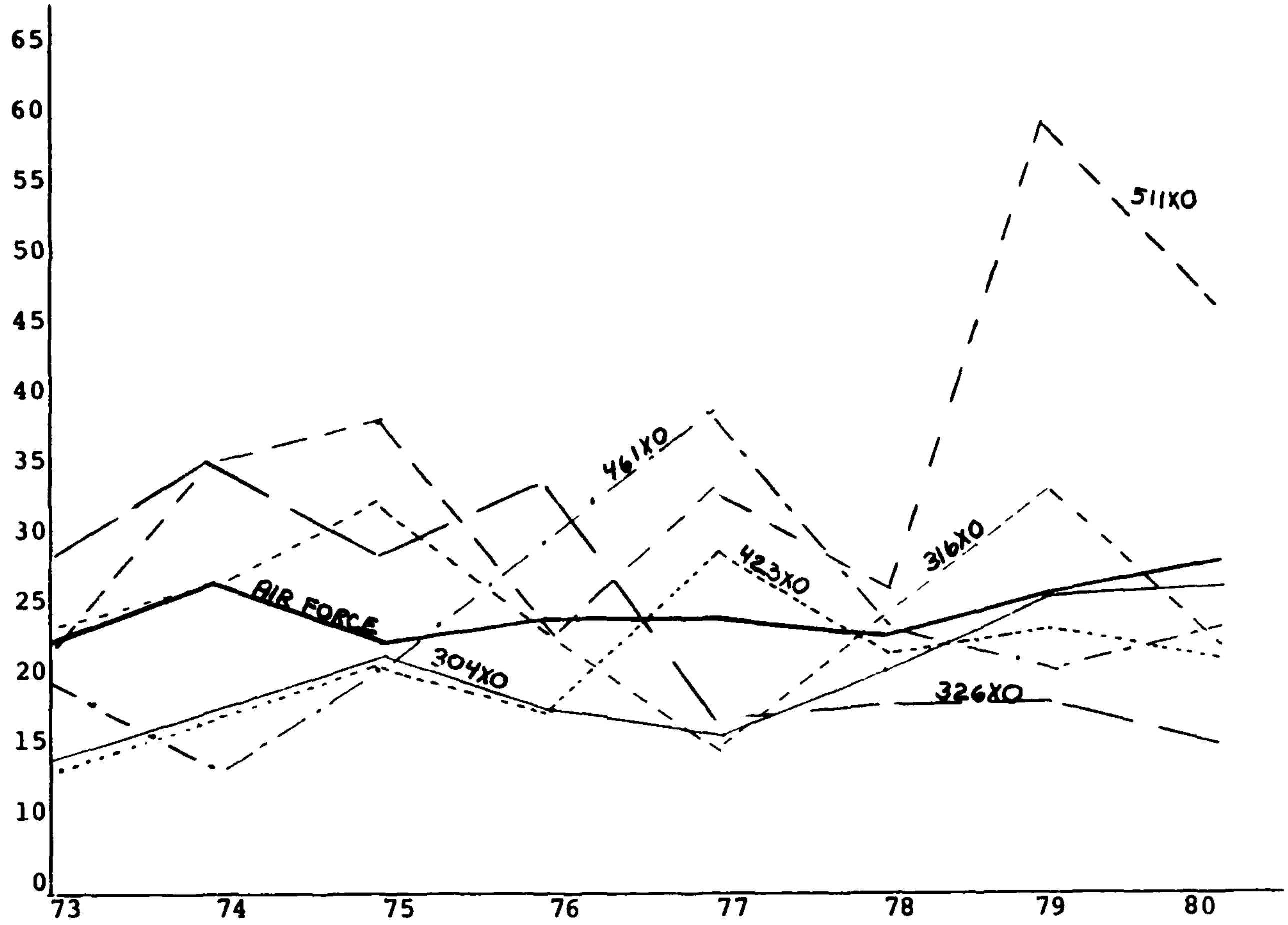


Fig. 4-17. First Term Retention

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AN EVALUATION OF THE CURRENT UNITED STATES AIR FORCE ENLISTED C--ETC(U)
JUN 81 R J CHAPIN, L SUAREZ
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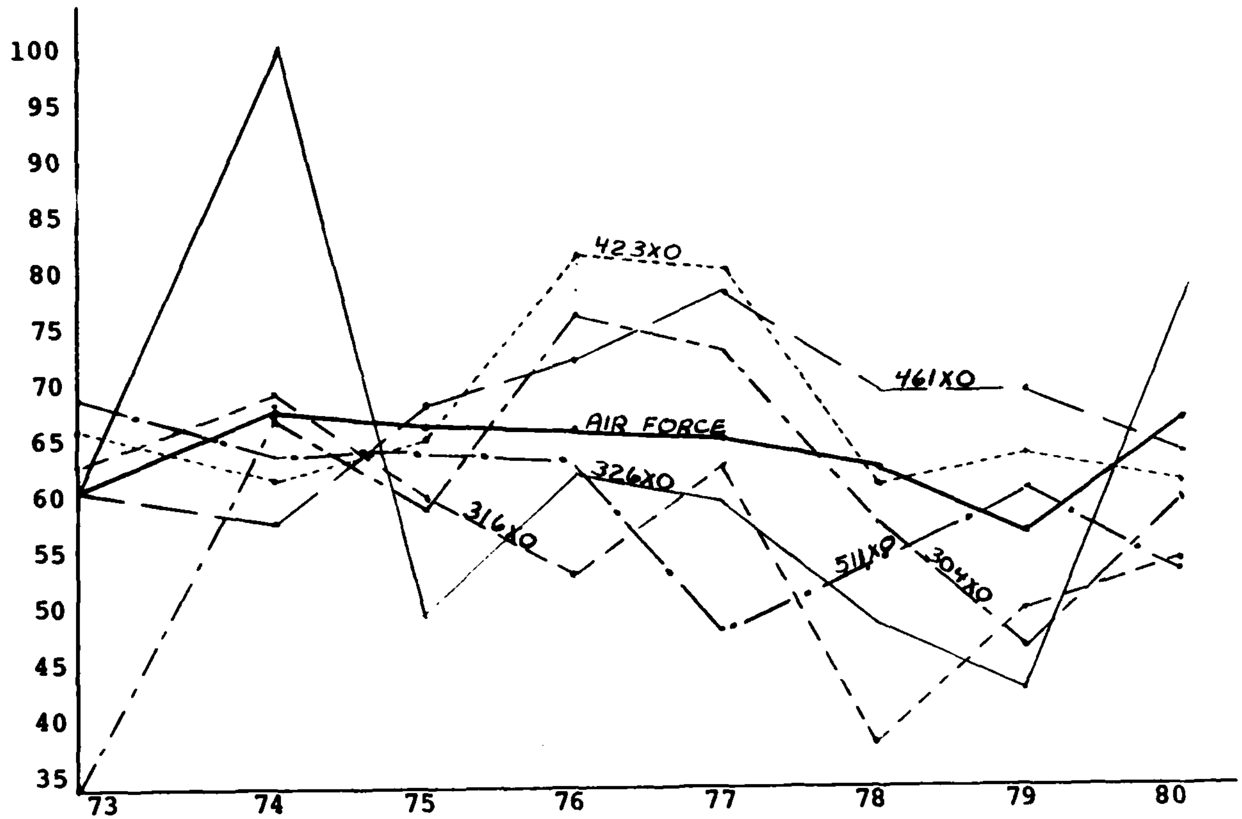

Fig. 4-18. Second Term Retention

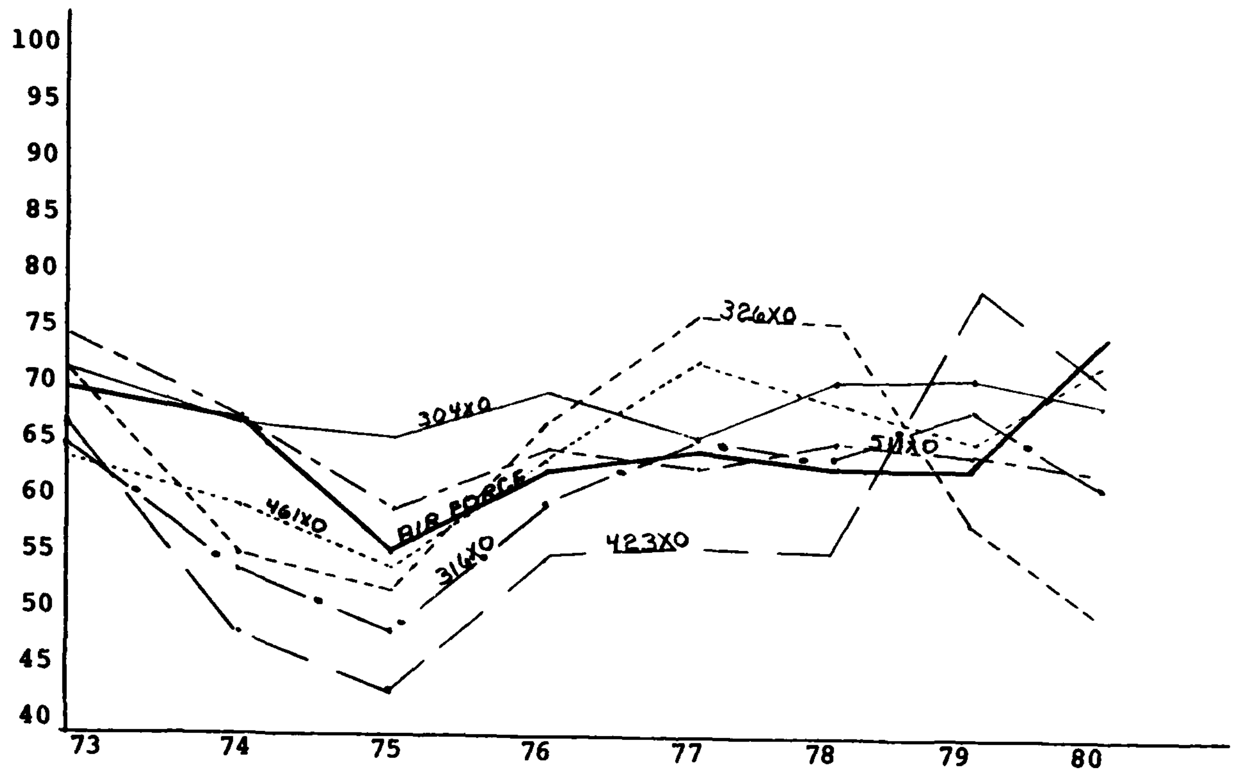

Fig. 4-19. Career Retention

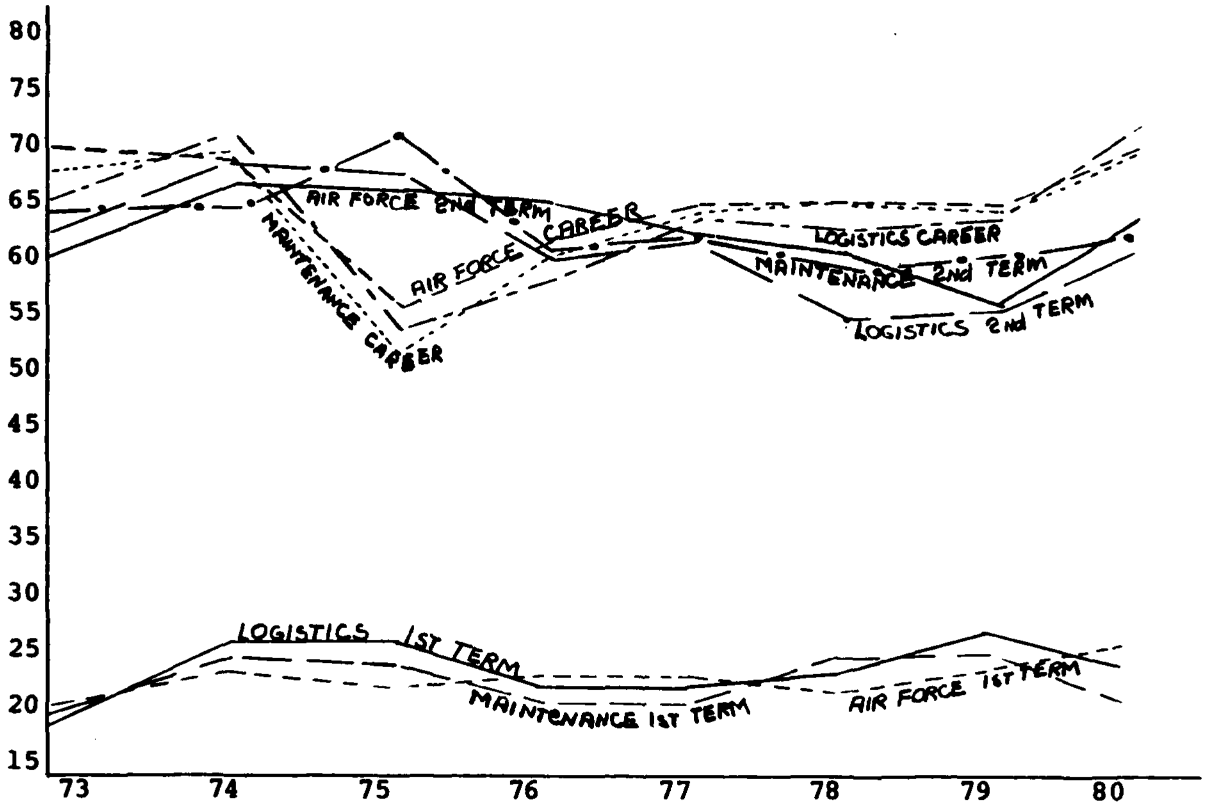

Fig. 4-20. Air Force, Logistics, Maintenance, First Term, Second Term, and Career Group Retention

the early 1970s the rates of the six career fields were somewhat above the Air Force average, but in 1980 only one career AFSC was above the Air Force average; computer technicians. Second term retention rates (Figure 4-19) for the six AFSCs showed many more deviations and fluctuations. Again, all but the avionics technician's rate were lower than the Air Force average in 1980.

The career retention rates (Figure 4-20) for the six AFSCs also fluctuated greatly from one year to another. In 1975 there was a noticeable and sharp downturn in all retention rates. While the Air Force average was on the upswing in 1980, all the subject AFSCs, except Munitions Maintenance had a downturn and most were well below the Air Force average. Finally, Figure 4-21 depicts the Logistics and Maintenance fields compared to the Air Force averages. The first term retention rates are relatively stable and close to the Air Force average. The second term retention rates are also relatively stable with both Logistical and Maintenance fields on an upswing in 1980. The career retention rates are on the upswing in 1980 and coincide very closely to the Air Force average. For several years (1974 to 1977) the career retention rates for Logistics, Maintenance, and Air Force were below the second term retention rates. Only in the last three years has the career retention rate exceeded the second term rate.

ANOVA.

2. Step 2. In order to validate the data, an ANOVA model and statistical procedures were employed (see Appendix B). The purpose of the ANOVA is to show that the AFSCs and fields being used in this study are related in a sense that no one group will unduly influence the retention rates. The ideal situation would be that all the AFSCs would reflect the retention trends of the current enlisted force. Should one or more of the six AFSCs and three fields be rejected by the ANOVA test as being outside the normative value, then the DUNCAN test subprogram would be used to identify the rejected group(s) and a further study of these rejected group(s) would be accomplished. The rejected group(s) would then be either dropped from the analysis or added back and qualified as being within the authors' tolerances for this thesis.

The results of the three ANOVA runs for first term, second term, and career retention are shown in Table 4-5. The conclusions drawn from the table are very important in the development of step 3. First, there was only one group out of the tolerance range of the test. The first term retention F value exceeded the critical value for that variable. H_1 was accepted where H_1 indicated to conclude that one or more treatment(s) (group(s)) means were not within the tolerance levels. The DUNCAN subroutine indicated that group 6 (computer technician career group)

TABLE 4-5

RESULTS OF ANOVA TESTS

	First Term Retention	Second Term Retention	Career Retention
Groups	Mean	Mean	Mean
1 304X0	17.25	56.38	68.00
2 316X0	21.50	54.38	59.88
3 326X0	21.25	59.38	61.63
4 423X0	18.50	63.75	57.75
5 461X0	20.50	63.63	63.88
6 511X0	30.38	57.50	63.75
7 AF	21.13	60.50	63.75
8 LOG	21.62	59.63	62.00
9 MAINT	20.88	60.00	62.88
	F Ratio: 3.705	F Ratio: .829	F-Ratio: 1.371
DUNCAN Test	Rejected Groups Gp. 6	Rejected Groups None	Rejected Groups None

F(critical) = 2.10
α = .05

was rejected. A further study showed that the group 6 mean was 30.38 which is well above the other groups. With exception of group 6, all other career groups in the first, second, and career variable divisions were shown to have means statistically considered the same.

Because the computer technician AFSCs were statistically the same for the second and career divisions and because a review of the first term yearly averages were all normal except in 1979 and 1980 (see Figure 4-18), it was decided to delete this AFSC in the first term retention division. Thus, there are eight groups in first term, nine groups in second term, and nine groups in career retention for the step 3 analysis.

Comparison of Data versus TOPCAP Targets.

3. Step 3. In the above step, it was concluded that the group retention rate averages were representative of the Air Force average retention rate for the years 1973 through 1980. A comparison of those rates to the current force structure was then considered. The retention rates have been lower than projected in the past (15). There has been an upswing in retention levels in the last two years. In order to meet the TOPCAP objective career force level in 1987 of five to thirty year TAFMS (202,800), the current and future first term retention rate must be greater than 26.4 percent, second term retention rate must be greater than 57.6 percent and the career retention must be greater than 87 percent. These rates are based on the NPS procurement mix of 90 percent-four year enlistees and 10 percent-six year enlistees (11:B-2). The four year enlistment period was used in the computation of the above retention rates because of its dominance over the six year enlistment groups.

By analyzing the TOPCAP configuration (Table D-21-1, USAFPP III Annexes) the authors were able to construct an optimum retention structure. The TOPCAP objective structure is made up of 57.3 percent first term airmen, 15.1 percent second term airmen, and 27.6 percent career airmen (of which 8.7 percent make up the third term). A differential between these different terms can be constructed which represents the retention rates. A comparison of the last two years (1979 and 1980) with these rates indicates that the Air Force average is slightly below the 26.4 percent first term optimum rate, as are Logistics and Maintenance. None of the five AFSCs is above this rate. Although the optimum rate is not being currently met, there is not a serious departure in the authors' opinion. The enlisted force is in the process of being reduced and the first term retention rates are within the TOPCAP tolerances. As stated in step 2, the computer technician AFSC was not included in this evaluation. That AFSC's retention rates were well above the optimum 26.4 percent level. Finally, the optimal first term rate used as a comparison may be a little high due to the 90 percent-four year-to 10 percent-six year-ratio actually used by the model. This ratio could lower the optimum retention rate by a small percentage. Thus, the first term retention rate would be closer to the optimum rate.

The six AFSC second term retention rates are above the 57.6 percent needed to sustain the future force (Table 4-4). The authors see no current problems in the second term retention rates for Air Force, Logistics, or Maintenance. The most seriously affected AFSCs are 316X0, Missile System Analyst (1980 = 54 percent), and 511X0, computer technician (1980 = 53 percent). Both are considered to have statistical average retention rates and are within the tolerance ranges.

The optimal retention rate of 87 percent for career retention is not being met by any of the AFSCs or fields in this research. The Maintenance field was the closest with a 74 percent retention rate in 1980. The worst rate was that of the 326X0, Avionics Technician, with a 47 percent 1980 rate. The Air Force trend is moving upward overall in 1980 (Figure 4-20) but currently is 15 percent from the optimum goal. This low career retention rate means that more first term airmen must be enlisted to maintain the objective force. The <u>Commander's Information on Enlisted Personnel</u> states:

> FY 80 first term career force entry objective is 17,700 (up approximately 2,400 from FY 79) . . . enough eligibles will be in a pool during FY 80 . . . but will require the efforts of everyone to meet the increased goal. . . . To meet FY 81 retention goals we must retain 65% of second term airmen and 93% of career airmen [6:54].

The second term goal for FY 81 might be met but there is serious doubt the high career retention rate will be obtained by FY 81. Much work will have to be done in the career retention area to meet the high projected levels.

Regression Analysis.

4. Step 4. Trend forecasting is very difficult because of the fluctuations in the retention rates over the years. Many outside influences tend to push or pull the retention rates away from any yearly trends. The SPSS program called REGRESSION was used to evaluate trends that might have developed in any of the AFSCs or fields under study.

A total of twenty-seven regressions were run, one regression for each AFSC, Air Force, Logistics, and Maintenance field times the first, second, and career retention areas from 1973 through 1980. The results are tabulated in Table 4-6.

The formula to calculate trend is:

$$Y_t = b_0 + b_1 x_t$$

where, t = the 2-digit year (81, 82, etc.)

A value of 0.1 was used as a rejection value.

Decision rule: If H_1: conclude that y_t was related statistically to x_t. If H_1 could not be rejected more than 10 percent of the time, then the regression was accepted (see Appendix B for statistical analysis). Using the 10 percent rejection criteria, only seven of the total twenty-seven regressions were used to depict a future trend. The R^2 values for these were considered adequate for the

TABLE 4-6

RETENTION TREND RESULTS

RUN	First Term Retention R^2	First Term Retention F	First Term Retention B_1	First Term Retention B_0	First Term Retention Sig	Second Term Retention R^2	Second Term Retention F	Second Term Retention B_1	Second Term Retention B_0	Second Term Retention Sig	Career Retention R^2	Career Retention F	Career Retention B_1	Career Retention B_0	Career Retention Sig
1	.480	5.53	1.00	-59.25	.06										
2						.001	.007	.179	42.71	.94					
3											.002	.009	-.476	71.64	.93
4	.018	.113	- .262	41.54	.75										
5						.415	4.26	-2.46	242.9	.08					
6											.137	.956	.917	-10.25	.37
7	.589	13.30	-2.38	203.39	.01										
8						.091	.605	-2.44	246.07	.47					
9											.050	.322	-.964	135.39	.59
10	.254	2.04	.762	-39.79	.20										
11						.122	.841	-1.00	140.25	.39					
12											.248	1.98	2.17	-108.0	.21
13	.079	.514	.738	-35.96	.50										
14						.155	1.104	.798	2.607	.33					
15											.353	3.28	1.37	-40.85	.12
16	.323	2.87	2.417	-154.5	.14										
17						.581	8.33	-2.23	228.71	.03					
18											.378	3.66	-1.214	156.64	.10
19	.044	.328	.233	9.611	.59										
20	.296	2.52	.250	2.00	.16										
21						.259	2.10	- .786	120.60	.20					
22											.018	.109	.286	41.89	.75
23	.096	.641	.345	-4.79	.45										
24						.479	5.51	-1.23	153.42	.06					
25											.054	.412	.607	16.42	.56
26	.065	.420	.226	3.57	.54										
27						.558	7.58	-1.48	172.93	.03					
28											.087	.568	.798	1.857	.48

Rejection rate = $\alpha > .1$; $F(critical) = 5.99$.

analysis. There were two regressions in the first term, four regressions in the second term , and one regression in the career retention area.

The following results were obtained using a 70 percent confidence acceptance level:

First Term Radio Relay Retention Trend
1981 - 17 to 26% (22% mean)
1982 - 19 to 27% (23% mean)

First Term Avionic Technician Retention Trend
1981 - 5 to 17% (11% mean)
1982 - 2 to 15% (8% mean)

Second Term Missile System Analysis Retention Trend
1981 - 39 to 49% (44% mean)
1982 - 35 6o 47% (41% mean)

Second Term Computer Technician Retention Trend
1981 - 40 to 55% (47% mean)
1982 - 37 to 53% (45% mean)

Second Term Logistics Retention Trend
1981 - 49 to 59% (54% mean)
1982 - 48 to 58% (53% mean)

Second Term Maintenance Retention Trend
1981 - 48 to 58% (53% mean)
1982 - 47 to 57% (52% mean)

Career Computer Technician Retention Trend
1981 - 53 to 63% (58% mean)
1982 - 52 to 62% (57% mean)

In all the regression trends computed, the rates were below the optimal rate. The Logistics second term retention was close to the optimal percent. Because such a small percentage of the total regressions could be used to generalize optimal trends could not be forecast. In comparing the cyclical-irregular component (percent of trends) of each of the regression models calculated, no significant fluctuations were noted. There was no indication that cyclical or irregular components were involved in the trends.

Although the rejection value for Air Force first term, second term, and career groups was greater than .10, these three regressions (without prediction intervals) were included for future indicators. The results were:

	1981	1982
First Term AF	22%	23%
Second Term AF	57%	56%
Career AF	65%	65%

The above information indicates that first and second term retention is much better than career retention. Because of the low R^2 values and high rejection percent, the information can't be validated but may only be used as a possible future guide to Air Force averages.

The results of the retention regression trend analyses tend to support the idea that there is nothing wrong with the TOPCAP system. The models will work to shape the enlisted force toward the objective structure. The current enlisted force is compatible with the force structure configuration. First and second term retention rates are within the tolerances needed to support the force. Future trends may be slightly lower than the optimum, but no serious trend fluctuations are projected.

There is a large problem in career retention rates within all AFSCs and fields under study. Although the Air Force reenlistment rate is running about 93 percent in the career category, the retention rate is running at only 72 percent in 1980. The career retentions have been on the upswing the past two years. It is the authors' opinion that the Air Force has fallen short in career retention. Many career NCOs are leaving the service causing retention rates to remain low. The TOPCAP force structure will work, should career retention increase considerably.

A shortcoming of the overall force planning process is its neglect for productivity considerations. Certain categories of personnel can be substituted for others, with some slight changes in force capability. Albrecht (R-2330-MRAL, 1979) examines the substitution potential between first-term and career personnel. Albrecht concludes:

> Productivity increases with experience, and a redistribution between first-term and career personnel could bring substantial annual cost savings with no loss of overall effectiveness. Unfortunately, the Air Force enlisted force planning process does not have the capability to analyze such issues. The process uses no data regarding the relative capabilities/productivities of different categories of personnel. Further, there is no ability to make cost tradeoffs among resource alternatives [2:64].

The force structure aims to provide a singular output: an enlisted force of a fixed size with predetermined relationships among its components (2:64).

Summary

The models, as now constructed, are working and producing the force structure. The analysis presented in this chapter indicates a need to increase career retention rates or introduce new model configurations to increase the career force. A change in the present technician to supervisor (up or out) policy could help alleviate the problem. The force planning process seems preoccupied with career progression. The authors concur that career progression/promotion opportunity should be preserved, but believe that more emphasis should be given (in the planning process of model development) to the issues of productivity, alternative manning configurations, and lateral rather than vertical progression within the system. Career retention rates will have to be increased dramatically to reach the TOPCAP objective structure by 1987.

CHAPTER V

RELATED TOPCAP SUBJECTS AND FUTURE TRENDS

Introduction

The enlisted manpower component of the United States Air Force currently numbers about 450,000. Approximately 70,000 new personnel are added each year and a similar number are separated, to include about 8,000 who retire (2:1). The 70,000 new airmen recruited are just under the estimated 75,000 airmen needed to sustain the TOPCAP objective force of 202,800 airmen, if all retention rates are attained (10:B-1). The enlisted force is subdivided into groups representing over 300 occupations, 5 skill levels, 9 grades, up to 30 years of service, and up to 18 years of experience in some grades. This force is also spread over 20 different commands and separate operating agencies, about 150 bases, and approximately 10,000 different work centers (2:1).

Many factors in the "real world" affect a force of this magnitude. Such things as manpower availability, increased technological sophistication, the labor market, and statutory considerations are but a few factors which must be considered of relevance to the force structure.

Overview

This chapter discusses several TOPCAP related subjects that could affect the enlisted force structure in the future. It also explores several Air Force long-range manpower and personnel planning considerations and looks at the manning retention outlook, in the enlisted aircraft maintenance field, for the 80s.

Airman Manning Ceilings

One of the first subjects that has a direct impact on the TOPCAP structure is airman manning ceilings. A 23 December 1968 memorandum from the Assistant Secretary of Defense (ASD M&RA) directed each service to initiate studies about future enlisted force management systems. This was an effort to find alternate solutions to the declining retention and promotion stagnation at that time. The Air Force drafted a plan and presented it to the ASD M&RA early in 1970.

The following reply was sent by the ASD M&RA after reviewing the TOPCAP document:

> First, I believe that you must explore alternative plans that are less costly than TOPCAP. Although the savings in active duty costs and the estimated level off of retirement costs are encouraging, I am convinced we must investigate alternatives that will produce even greater dollar savings. Second, since the long range career structure is built on your stated requirements for skill levels 7 and 9, I would like to see these requirements further validated by a force-wide occupational task analysis program using the techniques already developed by your Air Force researchers and widely accepted as the best work ever done in

> this fundamental area. Third, I am not convinced of the need to seek relief from the statutory ceilings on E-8 and E-9 [10:A-14].

The Air Force's program started as a study in March 1967 called The Airman Force Structure Analysis. It began as an in-depth analysis of the promotion system and the influence of manpower on grade structures. One of the major insights found during the studies was the impact the manpower grade authorizations and ceilings had upon promotions (10:A-7). The greatest impact of the grade distribution process was in the airman promotion program where quotas were controlled based on world-wide manning of grade authorizations for each specialty and upper grade ceilings. TOPCAP corrected the world-wide manning of grade authorizations problem, but had no control over ceiling limitations.

The current primary grade constraints are (10:D-1):

1. A predetermined career force size, based on a minimum number of 5 level airmen required in the force to support the stated 7 and 9 level requirements.

2. A statutory limitation on the number of E-9s and E-8s that can be in the force. No more than 1 percent of the total enlisted strength can be in the E-9 grade, and no more than 2 percent can be in the E-8 grade.

3. The projected continuation of statutory grade rates in the future.

Thus, the TOPCAP model must use the statutory ceiling for projection of the objective force structure.

The rate of progress in the grade distribution has been impaired by unprogrammed end strength reductions and by corresponding reductions in the percent of airmen allowed in the top six grades (E-4 to E-9) as related to the E-8, E-9 grade ceiling. Table 5-1 depicts the reductions associated with the unprogrammed levels. The Logistics and Maintenance fields are defined in Chapter IV.

The following observations are made from information contained in Table 5-1:

1. The total Air Force top six grades have dropped significantly below the FY 1973 levels.

2. Although the Logistics and Maintenance fields had higher percentages in the grades, both fields had a higher change rate, almost twice the decline rate of the Air Force. The drop has affected all functional areas and was imposed by external constraints and end strength declines. A recent Air Force Headquarters MPX brief states that the percentage top six funded authorizations and end strengths have stabilized for FY 80 and 81.

Critical skill retention levels have also declined at an alarming rate. From 1973 through 1980 the average Logistics drop was almost 18 percent (15). A future decline rate would seriously affect the TOPCAP objective force. Maintenance and Logistics authorizations have demonstrated an upward trend since 1976 (except for a 1980 downturn caused by policy) reflecting force structure

TABLE 5-1

AUTHORIZED (FUNDED) TRENDS (14)

Year	Overall AF % Authorized Top Six Grades	% Top Six Grade Authorization			Skill Level % 9-7-5 Trends		
		Top 6% MAJCOM	Top 6% LOGIST	Top 6% MAINT	MAJCOM Ave	LOGIST Ave	MAINT Ave
1973	71.9	81.9	81.2	82.6	80.0	80.9	82.6
1974	69.9	82.4	81.4	82.4	79.4	81.0	82.4
1975	67.4	75.9	70.7	72.8	79.7	79.4	81.4
1976	66.7	74.4	72.4	74.0	80.5	79.2	81.2
1977	66.0	71.5	69.2	70.6	80.9	80.0	81.7
1978	65.4	72.0	68.5	69.8	81.8	80.6	82.1
1979	66.4	71.0	67.7	68.7	81.9	80.5	82.1
1980	66.6	71.4	68.1	69.0	69.7	67.0	69.0
Change Since 1973 Δ	-5.3	-10.5	-13.1	-13.6	-10.3	-13.9	-13.6
% Δ Over the Average	-7.8	-14.0	-18.1	-18.5	-13.0	-17.7	-16.9

modernization programs. However, there has not been time for this rise to result in a lot of stripes showing up in technical areas and on the flightline. Airmen brought into Logistics and Maintenance in 1976 are still relatively junior in grade and skill (15).

Attrition Trends

A second area of concern is attrition trends in the first term airman group. Table 5-2 shows the first term attrition rates from 1971 to 1979 for both male and female airmen (6:66). In the entering year 1979, 27 percent of the male airmen and 28 percent of the female airmen separated from the Air Force before serving three years active duty. Since 1971, almost .33 of the male and .40 of the female airmen have separated before completing three years service. This type of attrition can also cause the TOPCAP objective force structure to deviate from the optimal configuration. Based on statistical analysis, it is predicted with 60 percent confidence that the 1980 and 1981 male airmen attrition rates will be approximately 28 and 28.5 percent respectively (see Appendix B for statistical procedures). Such high attrition rates will cause a need to recruit a greater number of first term airmen in order to obtain the levels needed to sustain the objective force. Training dollars and work productivity are lost or inefficiently wasted with current attrition rates.

TABLE 5-2

FIRST TERM ATTRITION TRENDS (6)
(Through Three Years of Service)

	Entering Years								
	71	72	73	74	75	76	77	78	79
Male %	21	26	30	31	30	26	26	27	27
Female %	46	39	34	36	33	30	30	29	28

Experience Profile

A third subject area related to TOPCAP is the experience profile of the entlisted force. The figures shown in Table 5-3 (14) include average age, average time in grade (TIG), and average time in service (TIS) of the grades E-3 through E-9 for FY 1980. The experience is equally distributed between Air Force, Logistics, and Maintenance. The experience profile is an indication that TOPCAP is stabilizing the force currently and that the Logistics and Maintenance fields are extremely close to the Air Force averages. This stable profile indicates that the TOPCAP models, which construct the grade levels, are working well with respect to the internal enlisted structure.

Length of Enlistment

A fourth important area of TOPCAP is the six year enlistment. Title 10, United States Code 505, allows two,

TABLE 5-3

EXPERIENCE PROFILE IN YEARS (1980) (14)

	Age (Average)			TIG (Average)			TIS (Average)		
	AF	LOG	MAINT	AF	LOG	MAINT	AF	LOG	MAINT
E9	45.2	45.2	45.2	3.2	3.2	3.2	25.7	25.7	25.7
E-8	41.5	41.4	41.2	2.1	2.0	2.0	22.2	22.1	21.9
E-7	38.6	38.4	38.2	2.5	2.4	2.4	19.2	19.0	18.8
E-6	35.1	34.8	34.5	2.5	2.5	2.6	15.4	15.1	14.9
E-5	29.2	29.1	28.8	3.3	3.3	3.2	9.3	9.3	9.1
E-4	24.3	24.0	23.8	1.6	1.4	1.3	4.4	4.3	4.1
E-3	21.3	22.1	21.2	.8	.8	.8	1.6	1.6	1.6

three, four, five, and six year terms of enlistment. In September 1971, a change in Air Force policy allowed six year enlistments. Prior to this change, only four year enlistments were authorized. The six year enlistment option was implemented to provide recruiters with alternative methods of meeting requirements in hard-to-fill AFSCs. Recent studies recommend that more emphasis be placed in recruiting six-year enlistee accessions into the high training cost AFSCs (10:B-2). Based on these studies, the six-year enlistment option is limited to high training cost and hard-to-fill AFSCs. Under this program the nonprior service airman is:

1. Guaranteed training in any of the applicable Air Force specialties for which qualified and for which an Air Force requirement exists.

2. Guaranteed promotion from E-1 directly to E-2, immediately upon successful completion of Basic Military Training (10:B-2).

The six year enlistment could be equated to approximately 10 percent of the annual nonprior airmen accessions. The TOPCAP objective force structure contains a nonprior airmen procurement mix of 90 percent four year enlistees and 10 percent six year enlistees. The 90-10 percent mix is not an annual goal. The mix can be changed as recruiting trends and training costs change. Also, if recruiting trends or costs dictate, the other enlistment terms (i.e., two, three, or five year enlistments) could be implemented. As of FY 1980, 100 percent of Air Force enlistments are from the four and six year enlistments (10:B-2). A large change in this mix or a new enlistment policy will affect the TOPCAP optimal structure. There are no goals or objectives for the term of service. The term lengths are decided by the policy maker.

Air Force Manpower and Personnel Planning

Air Force planners are deeply involved in studying environmental factors which will play a significant role in force structure and composition in the future. HQ USAF/MPXXX, the OPR for Long-Range Planning, prepared a Manpower and Personnel Long-Range Planning package for the Air Force. The same section also prepared a package which discussed the manning retention outlook for the aircraft maintenance career field in the 80s. The information from those two packages, of most relevance to this thesis, will be discussed.

Long-Range Planning

The Air Force planning people depict the personnel situation in terms of where we've been and where we're going (Figure 5-1). In planning, assumptions are made that: the U.S. will maintain its world-wide commitments, the basic Air Force mission will remain essentially the

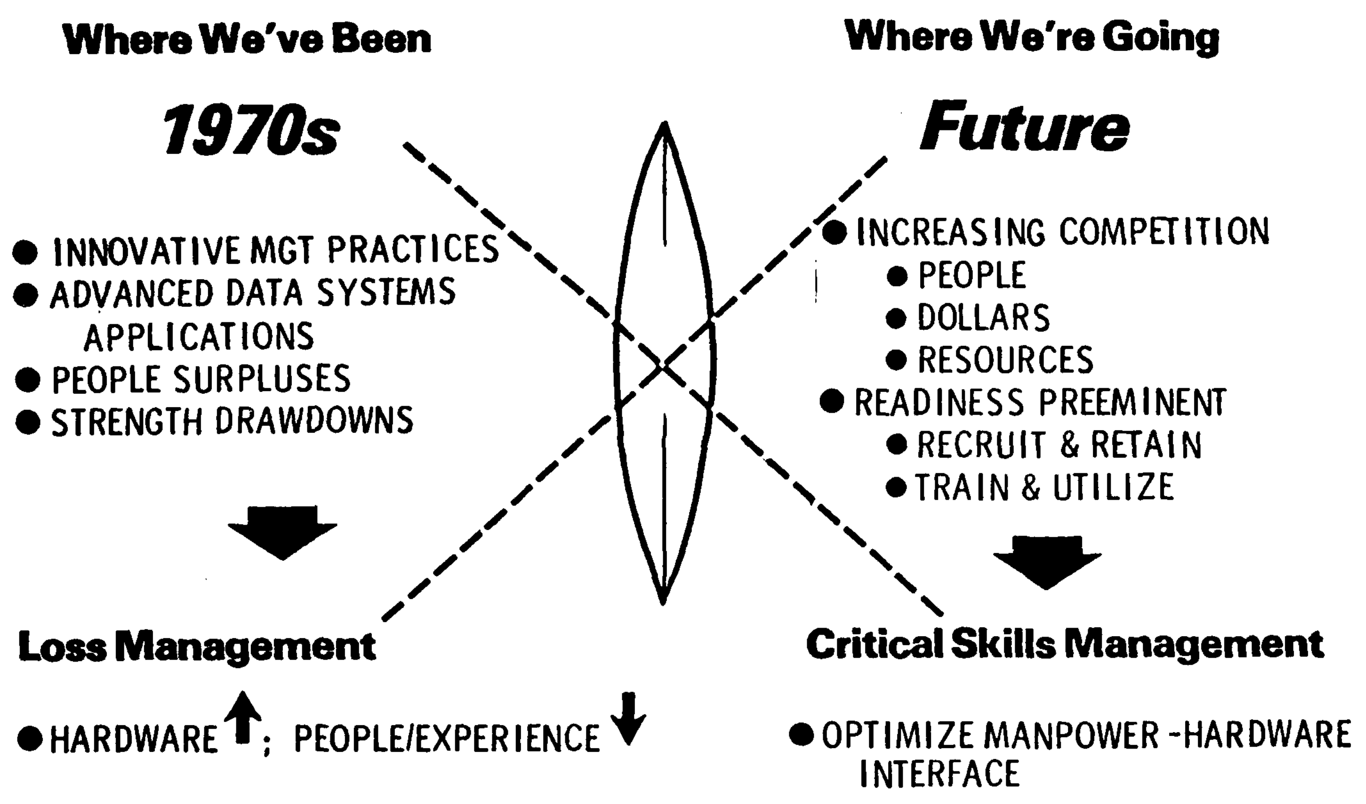

Fig. 5-1. Overview of Manning Environment Directions (16)

same, and that the Extended Planning Annex (EPA) is a valid descriptor of the force structure (16).

Next, the planning process looks at trend areas and highlights the significant implications of the trend areas identified. Several trend areas are of special significance if the loss of highly trained maintenance personnel is not checked. It is expected that technology will require the performance of more complex tasks, which will require people of above average intelligence. At the same time, it is expected that the number of high school graduates will be decreasing making it more difficult to meet recruiting goals for high school graduates. Concurrently, the competition for maintenance personnel will increase from the aviation industry and scientific-technical companies. In addition, demographic studies show that, between 1980 and 1990, the eighteen to twenty-four age population will decline by 14.6 percent. The seventeen to twenty-one year old population will decline sharply, down 24 percent from 1979 levels by 1992 (16).

Air Force planners list five objectives to help the Air Force adjust to the challenges of the future environment. Two of those objectives capture the essence of what this six-thesis effort is about. The objectives are:

> 1. Motivate and retain high quality individuals possessing critically needed skills to insure effective AF mission accomplishment. [and]

2. Employ people (after training) to the maximum of their capabilities and desires consistent with AF mission requirements [16].

Aircraft Maintenance Manning
Retention

The Aircraft Maintenance field illustrates the tough challenge, which the Air Force will face during the eighties, in the personnel recruitment and retention areas. The passenger airlines, general aviation industry, aerospace industry, foreign employers, and technical schools requiring instructor mechanics will increase their demand for trained technicians. The civilian technician population is aging thereby increasing the demand. Civilian salaries are expected to increase. Commonality between Air Force and civilian systems is expected to rise, making our personnel a ready-to-use resource (17).

Air Force retention in the aircraft maintenance field is viewed as wavering. The recruiting pool is expected to shrink during the decade. Competition is increasing. The bottom line of the situation is that replacements are going to be very hard to find; therefore, every avenue must be explored to retain our technicians (17).

Summary

The enlisted force currently requires approximately 70,000 new personnel each year to maintain an objective force of between 450,000 and 500,000. Recent trends have demonstrated a loss of experienced personnel which seems to have stabilized in FY 80 and 81. Current attrition rates in first term airmen ranks are extremely high resulting in higher recruiting and training expenditures. The experience profile of the current force appears to indicate that the TOPCAP models are working effectively with respect to the internal enlisted structure. Recent studies indicate a need to emphasize the six year enlistment option in high-training cost and hard-to-fill AFSCs. In the area of manpower and personnel planning, some significant trends are: increasing complexity of technology, shrinking manpower pools, lower educational levels, and increasing competition for the scarce personnel resource. Air Force efforts must be directed towards effective recruitment and retention methods and effective training and utilization of personnel.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The systems concept of an organization provides management an opportunity to view itself in terms of its elements, its significant relationships, and its relationship to its environment. Schoderbek, Schoderbek, and Kefalas classify systems as follows:

> The classification of systems into open and closed rests upon the concepts of boundaries and resources. The resources of a system are all the means available to the system for the execution of the activities necessary for goal realization. They include not only personnel, money, and equipment, but also opportunities (used or neglected) for the aggrandizement of the human and nonhuman resources of the system.
>
> In a closed system all of the system's resources are present at one time. There is no further influx of additional resources across the system's boundary from the environment. In open systems, on the other hand, additional supplies of energy or resources can enter the system across its boundaries [26:30].

The Air Force personnel system is an open system which depends on a supply of approximately 70,000 recruits annually. It spends millions of dollars training these individuals and attempts to retain the best in each career field for the career force. The system seeks intelligent individuals of good moral character from the environment.

To get a complete picture of an organization, its resources, and its environment, Schoderbek, Schoderbek, and Kefalas use a diagrammatrical presentation (26:24).

Such a presentation applied to the aspects of the Air Force personnel system discussed in this thesis, may be represented as in Figure 6-1.

Figure 6-1 shows that the Air Force personnel system can exercise control over some factors which affect it and it can't control others. Highly trained technicians are an extremely costly and important resource to the Air Force. The statistical research conducted in this thesis demonstrated a problem in retention of career enlisted individuals in technical fields. Air Force long-range planning shows an increased demand for technicians by civilian sources during the eighties. Air Force studies also foresee a diminishing pool of individuals of military age. Technology is expected to become more complex during the next decade. The combined impact of these events clearly indicates the importance of retaining every technician trained by the Air Force. While the Air Force can't influence demographics or outside demand for technicians, it can influence such factors as its own career progression policies. Assuming that some technicians don't want to be managers, the present career progression system may be driving some valuable technicians away. It is also promoting technicians into supervisory and managerial positions, resulting in the loss of their service as technicians. Systems must react to feedback and adapt to their environment to survive. The Air Force should consider

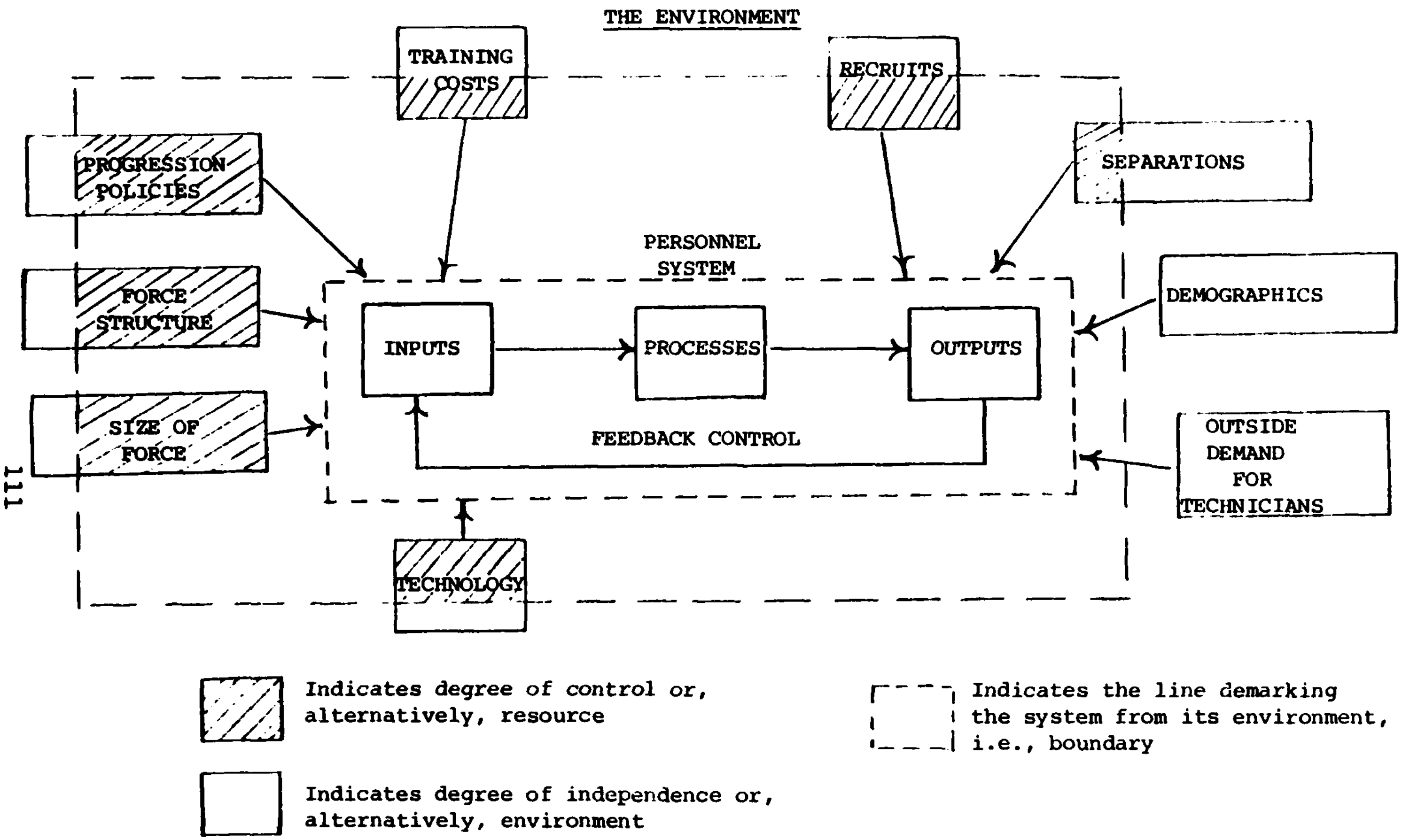

Fig. 6-1. Personnel System Resources and Environment

modifying personnel utilization policies to get a better return on the large sums of money invested in the training of technicians. In light of retention problems and the future environmental situation, a more flexible policy for managing the technician resource is indicated.

This thesis has analyzed the Air Force enlisted force structure and career progression system. It was discovered that the enlisted force is structured using sound principles. The career progression system, based on a three-tier system, leading ultimately into management positions, is a limiting factor. Though it may be successful in most career fields, its universal application should be reviewed.

APPENDICES

APPENDIX A

GLOSSARY OF KEY TERMS

Accession--the act of increasing the airman skill or grade level manning by adding more eligible and qualified airmen to that level.

Advanced Personnel Data System--Procurement Management Information System (APDS-PROMIS)--"this system facilitates the procurement of personnel by allowing the efficient programming of training and initial classification requirements [10:G-1]."

Air Force Specialty (AFS)--"a group of related positions on the basis of similarity of knowledge, education, training, experience, and other abilities required to perform them [10:G-1]."

Air Force Specialty Code (AFSC)--"a five-digit code used to identify an AFS [10:G-1]."

Airman--"any person belonging to the USAF enlisted force (E-1 through E-9) [10:G-1].

Attrition--the natural expected or unexpected decrease in the number of airmen in a career group over a period of time (usually years).

Career Airman--"an airman having more than four years of completed active service and serving on a second or subsequent enlistment [10:G-1]."

Career Airman Reenlistment Reservation System (CAREERS)--"this system controls first-term reenlistment by AFSC to meet the first-term reenlistment objectives [10:G-1]."

Career Feeder--"those first-term airmen in fourth or sixth year of service who are needed to satisfy the requirements of input into the career force [10:G-1]."

Career Field--"a group of occupations in the airman classification structure that are broadly related on the basis of required skills and knowledge [10:G-1]."

Career Field Subdivision (CFS)--

> . . . a division of career field in which closely related Air Force specialties are arranged in one or more ladders to indicate lateral functional relationship, emerging at the advanced or superintendent skill level. Identified by the first three numerical digits of an AFSC [10:G-1].

Career Journeyman--"a 5-skill airman required to sustain the supervisor/technician career requirement [10:G-1]."

Career Progression Group (CPG)--

> . . . a cluster of AFSCs which configured into a ladder account for all input AFSCs and permit skill-level progression from entry to 9-level via upgrade procedures characteristic of the cluster [10:G-1].

Critical Skill--"that skill which is needed by the Air Force to maintain minimum standards in the technical maintenance career fields [10:G-1]."

First Term Airmen--"those airmen who have not completed their initial period of enlistment [10:G-1]."

High Year of Grade Tenure--"the last year of TAFMS an airman is permitted to remain on active duty in his or her currently held grade [10:G-1]."

Low Year of Grade Tenure--"the first year of TAFMS an airman may possess a particular grade [10:G-1]."

Manager--one who is accountable for the overall planning, organizing, coordinating, directing, and controlling of maintenance activities, at branch level or higher (24:24).

Nonprior Service Procurement (NPS)--"procurement of first term airmen from the civilian labor pool who have no prior military service [10:G-1]."

Promotion Opportunity--"a percentage probability of achieving the next higher grade by the end of a specified promotion zone [10:G-1]."

Prior Service Procurement--"the procurement of personnel to fill career requirements from the civilian resource who have satisfactorily completed four or more years of active military service [10:G-1]."

Promotion Phase Point--

> . . . refers to the number of years service required before the majority of personnel can expect to be promoted to a particular grade. The phase point is calculated by taking the average years of service of all promotees to a grade during the promotion cycle [10:G-1].

Promotion Zone--"the number of years an airman in a particular grade is considered for promotion to the next higher grade [10:G-1]."

Reenlistment Percent--"a rate obtained by dividing the number of reenlistments by the total number eligible to reenlist [10:G-1]."

Retention Rate--"a rate computed by dividing the number of reenlistments for a given year by the total number of airmen separated in that particular year group [10:G-2]."

Selective Reenlistment--"a program to control the quality of airmen reenlisted in the career force and to insure the retention of highly qualified personnel [10:G-2]."

Selective Reenlistment Bonus (SRB)--"a reenlistment incentive that may be paid to certain airmen who possess a critical skill at any reenlistment point up to ten years TAFMS [10:G-2]."

Self-Renewing Occupational Field (SROF)--"specialty groupings which are basically self-renewing and can be meaningfully managed in terms of both manpower and personnel considerations [10:G-2]."

Severance Pay/Readjustment Pay--

> . . . a one-time lump-sum payment, based on TAFMS, payable to career airmen who are involuntarily separated from active duty prior to attaining retirement eligibility. It does not include discipline type severances [10:G-2].

Shortage Specialty Proficiency Pay (SSPP)--"referred to as pro-pay--a retention incentive pay for designated specialties paid at a monthly rate [10:G-2]."

Skill-Level--

> . . . the level of qualification in an AFS depicted by the fourth digit in the AFSC as follows: 1-helper level, 3-semi-skilled level, 5-skilled level, 7-advanced level, 9-superintendent level [10:G-2].

Special Duty Identifiers

> . . . a code to identify position authorizations and individual airmen assigned to and performing an actual group of tasks on a semi-permanent or permanent duty basis. These duties are unrelated to any specific career field [10:G-2].

Supervisor--"one who is accountable for the work of technicians and technical supervisors, and for the administrative details involved with that work [24:24]."

Technician--

> . . . one who uses technical skills to perform maintenance tasks. This may be done as an apprentice technician, journeyman technician, or specialist, as these terms are used in duty titles [24:24].

Technical Supervisor--"one who uses technical skills to perform maintenance and who also directly supervises others performing maintenance [24:24]."

Total Active Federal Military Service (TAFMS)--"total number of years on active duty [10:G-2]."

Total Objective Plan for Career Airman Personnel (TOPCAP)--

> . . . establishes the essential characteristics of an attainable USAF enlisted force and the necessary body of management concepts required for its development and maintenance [10:G-2].

Uniform Airman Records (UAR)--that airman data which relates to attrition rates, upgrade times and date of entry of each CFS.

Variable Re-enlistment Bonus (VRB)--

. . . an additional reenlistment monetary incentive paid to certain first-term airmen who possess a critical military skill at the time of their first reenlistment. The VRB was replaced by the SRB effective 1 June 1974 [10:G-2].

Year Group--

. . . *refers to the TAFMS of individuals at any* given point in time (i.e., the fourth year group refers to all the enlisted individuals who have completed more than thirty-six months and less than forty-eight months TAFMS) [10:G-2].

APPENDIX B

STATISTICAL ANALYSIS PROCEDURES

This appendix contains the statistical analysis used in support of Chapter IV. Three types of statistical models and procedures were used in Chapter IV. They were the Analysis of Variance (ANOVA) model, Simple Linear Regression model (trend analysis), and descriptive/categorical procedures.

Statistical inference is one of the two major categories of statistical procedures, the other being descriptive statistics. Chapter IV contains both types, but emphasizes statistical inference. Hypothesis testing is the approach taken in Chapter IV. There are two methods of hypothesis testing. The more established is the "classical" or sampling-theory approach; the second is known as the Bayesian approach. The classical method is found in most major statistics books and is widely used in research applications. It represents an objective view of probability in which the analysis and decision making depends upon the analysis of sampling data. A testing hypothesis is established, and is either rejected or fails to be rejected, based on the sample data (12:406).

The Bayesian approach is an extension of the classical approach in that it also incorporates sampling data. However, it goes beyond to incorporate all other information that is available to the decision maker. Most of this additional information consists of subjective probability estimates. Various decision rules are established, cost and other estimates can be introduced, and the expected outcomes of combinations of these elements are computed (12:406).

Although the Bayesian approach may eventually win a major place in applied statistical inference, its acceptance in actual research practice to date has been slow. In this analysis the classical approach will be used.

Statistical analysis has come to play a central role in the decision-making process. The type of analysis introduced here involves the decision to take one action versus another based upon the acceptance or rejection of the hypothesis. When a sample statistic differs from the parameter stated in the hypothesis, a decision must be made as to whether the difference is a consequence of random sampling error or of a real difference between the sample population and the population whose parameter is stated in the hypothesis. The latter difference is called a "significant difference" and would cause rejection of the hypothesis. Because of this reason, hypothesis tests are often called "tests of significance" (1:p.8-1).

Fundamental to statistical estimation is the concept of random samples. A simple random sample is one in which every element in the population has an equal and independent chance of being selected. A statistic is a function of one or more random variables from a random sample that does not depend upon any population parameter (1:p.8-2).

One of the most fundamental and important theorems in the statistical work used in this appendix involves the distribution of the sample mean. The central limit theorem states:

> If a population has a mean μ and a finite standard deviation σ, then the distribution of the means of all possible samples of size n drawn from that population will be approximately normal with a mean μ and a standard deviation of $\sigma/\sqrt{n}$ [1:p.8-4].

It is important that the distribution of sample means $\bar{x}$ will approach a normal distribution even when the population itself is not normally distributed. There is a distinction between the distribution of the sample and the distribution of the sample mean. If the sample is random, then the distribution of that sample should resemble the distribution of the population it was drawn from. But, the distribution of the sample <u>mean</u> will be normal. This understanding of the distinction is important to the application of the sampling used in this appendix and the thesis hypothesis testing (1:p.8-5).

A hypothesis is a statement about a population parameter. In hypothesis testing, two hypotheses are constructed. The first is called the null hypothesis (H_0). It represents a claim or statement to be refuted. The null hypothesis states that no difference exists between the parameter and the statistic being compared to it. The null hypothesis is expressly formulated to test for possible rejection (12:407). The second hypothesis, the alternative (H_A or H_1), is the opposite of the null and is usually the operational statement of the regular hypothesis. The alternative hypothesis statement supports the evidence supplied in the sample (1:8-15). If the null hypothesis is rejected, the alternative hypothesis is accepted. In any hypothesis test, a conclusion is reached only when the null hypothesis can be rejected. If H_0 cannot be rejected, the only possible conclusion is that the sample data does not support H_1. This is known as the "weak" conclusion, because it is a fall-back conclusion (the sample evidence cannot support the contrary) (1:8-16).

It is possible to reject the null hypothesis and arrive at the wrong decision based on the alternative H_1. To prevent this from happening too frequently, a level of significance is established. The level of significance, called α (alpha), is set at a level which corresponds to the consequences which will be incurred if the null hypothesis is rejected when it is in fact true (1:8-16). In making decisions, the experimenter runs the risk of making a wrong decision. The problem can be illustrated in Figure B-1.

A Type I error is made if conclusion H_1 is selected as being correct when, in fact, H_0 is the correct

Decision	Actual State	
	H_0 is True	H_0 is False
Accept H_0	Correct Decision	Type II Error
Accept H_1	Type I α Error	Correct Decision

Figure B-1. Error Table (1:408)

conclusion. A Type II error is made if conclusion H_0 is selected as being correct when, in fact, H_1 is the correct conclusion. A statistical decision rule specifies, for each possible sample outcome, which alternative should be selected. The value A in the decision rule is called the action limit of the decision rule (22:261). The probability of a Type I error is denoted by the α level of significance, also called the α risk. The probability of a Type II error is denoted by β (beta) and is called a β risk (22:266).

In probabilistic terms, the level of significance (α risk) can be stated as the probability that H_0 will be rejected when it is true. The α risk is the most important type error because it is concerned with the acceptance rate of the alternative H_1. There is less concern about the β risk. The β risk is not used in this analysis. Because there should be very little chance to accept H_1 when in fact H_0 is true, the use of an α level of .05 is used as a significance level throughout the rest of this appendix.

The testing for statistical significance in this appendix follows a sequence of steps as follows (1:8-27):

1. State the hypothesis--establish the alternative hypothesis first. H_1 contains a statement of what is to be supported by the sample data. The null hypothesis (H_0) then concludes other possibilities.

2. Select the appropriate test statistic--the choice of the appropriate test depends upon the statement made in the null hypothesis. The manner in which the sample is drawn, the nature of the population, and the type of measurement scale used (nominal, ordinal, interval or ratio) affect the decision.

3. Select the desired level of significance (α risk)--the costs of rejecting a true hypothesis should normally be decided before the collection of data. The larger the α risk the lower the β risk. An α level of .05 is used in this appendix as previously discussed.

4. Select the sample and compute the test statistic--this is done after the data collection phase. A calculated value is obtained.

5. Compare the computed value with a critical value obtained from an appropriate statistical table. The critical value is the criterion which defines the region of acceptance for the null hypothesis.

6. Make the decision. Reject H_0 if the test statistic is more extreme than the critical value.

7. Draw the conclusion. A statement of what has been accomplished by rejecting (or not rejecting) the null hypothesis.

All the statistical tests used in this annex were calculated using the Statistical Package for the Social Sciences (SPSS) computer programs. SPSS is an integrated system of computer programs designed for statistical analysis. In addition to descriptive statistics, SPSS also contains procedures for correlation, means and variances for subpopulations, one-way analysis of variance, regression analysis, scatter diagrams, and factor analysis. SPSS allows a great deal of flexibility in data format (23:1). The appropriate SPSS subprograms used in this analysis were CONDESCRIPTIVE, CROSSTABS, REGRESSION ANALYSIS, and ONE WAY.

There are two general classes of significance tests, parametric and nonparametric. When the parametric test is used, the following conditions are met:

1. The observations must be independent.

2. The observations must be drawn from normally distributed populations.

3. The populations must have equal variances.

4. Measurement scale must be at least interval, so that arithmetic operations can be used.

Parametric tests are the more powerful and are usually the tests of choice if the above conditions are met (12:413).

Nonparametric tests have fewer and less stringent assumptions. They do not specify normally distributed populations or equal variances. Nonparametric tests must be used with nominal data and are the only correct tests to use with ordinal data, although parametric tests are sometimes used. The nonparametric test provides the same statistical testing power with a sample of 100 as a parametric test with a sample of 95 (12:413). Based on the large sample size of independent observations and assumed normally distributed population of the enlisted force average, parametric tests were used for the inferences about differences between population means.

The different statistical tests used in this thesis are discussed below. The results of the tests and the conclusions drawn are discussed in Chapter IV as part of the analysis. Following a discussion of the statistical test, an example, using data pertinent to the problem in Chapter IV, is given.

Analysis of Variance (ANOVA)

The ANOVA models are useful for studying the statistical relation between a dependent variable and one or more independent variables. In the special terminology of ANOVA, an independent variable is called a factor. A factor level or treatment is a particular outcome of the independent variable. In a multifactor ANOVA, there are two or more independent variables (22:525). The ANOVA used in this thesis is a single factor ANOVA also called a One-way ANOVA. It has only one independent variable.

For the single-factor ANOVA model

$$\mu_1 = \mu_2 = \mu_r$$

where μ_r is the average of each treatment of the independent variable. Each treatment is usually treated as a group in the ANOVA so that μ_r is also the mean of each of the r groups. This test uses the SPSS program called ONE-WAY. The ONE-WAY procedure examines the question of whether or not groups are different with respect to their mean value (6:45). Should one or more mean value be different from the other means, the ONE-WAY posteriori contrasts tests called DUNCAN will identify the out of tolerance group. The DUNCAN posteriori test may be used whether or not the analysis of variance is significant (23:428).

The statistics collected from the ONE-WAY printout are the following:

1. F-ratio
2. F-probability
3. Group number
4. Group count
5. Group mean
6. 95% confidence interval for the mean
7. DUNCAN procedure, SUBSET1, SUBSET2, SUBSET3

This information was used to calculate the values in Chapter IV group descriptions. The F-test for quality of treatment means is one of the more important statistical tests. An F-test was conducted to test for the equality of treatment means (22:533-535). The alternative conclusions were:

H_0: $\mu_1 = \mu_2 = \mu_r$;
H_1: Not all μ_r's are equal.

For the single-factor ANOVA, when $\mu_1 = \mu_2 = \mu_r$:

$$F^* = F(r-1, r_t - r)$$

where r = number of treatments and
n_t = total observations.

For an appropriate decision rule to control the α risk:

If $F^* \leq F(1-\alpha; r-1, n_t - r)$, conclude H_0;
If $F^* > F(1-\alpha; r-1, n_t - r)$, conclude H_1.

where F^* is taken from the F-ratio from ONE-WAY.

Should the conclusion be H_1, that is, that the group means are not equal, then the DUNCAN test results will indicate the group(s) that have the rejected means.

Example: First Term Retention Model

H_0: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6$;

H_1: Not all μ_r's are equal.

α risk = .05 level.

$$F(1-\alpha;r-1,n_t-r)$$

There were six group treatments and forty-eight total observations in the example problem, so $r=6$ and $n_t=48$.

$$F(.95;5,42) = 2.442 \ (4)$$

This was considered the critical F value and was found by finding the value in the statistical tables (8:98). Decision Rule:

If $F^* \leq 2.442$, conclude H_0;

If $F^* > 2.442$, conclude H_1.

From the ONE-WAY computer printout of the F ratio for first term retention the $F^* = 3.955$, so H_1 was concluded; the mean first term retentions were not the same for the different groups. Looking at the ONE-WAY DUNCAN test subsets, group number 6 was alone in subset 2, indicating it was the group that had the different mean. This was the 511X0 computer technician group.

Linear Statistical Regression Model

Linear regression analysis enables one to ascertain and utilize a relation between a variable of interest (called a dependent variable) and one or more independent variables (22:434). The regression function relates E(y) (the mean of y) to x, the value of the independent variable by:

$$E(y) = \beta_0 + \beta_1 X$$

The parameters β_0 and β_1 are called regression parameters. β_0 is the intercept of the regression line and β_1 is the slope of the line (22:440). This model implies that for any given value x of the independent variable:

1. y is normally distributed;
2. $E(y) = \beta_1 + \beta_1 X$; and
3. $\sigma^2(y) = \sigma^2$.

The coefficient of simple determination is denoted by R^2 and expressed as a decimal point or percent. R^2 means that the variability of y is reduced by R^2 percent when x is considered. In general:

$$0 \leq R^2 \leq 1$$

where the lower bound implies there is no linear statistical relation and the upper bound implies a perfect linear relation between y and x; the closer R^2 is to 1.0, the greater the degree of linear relationship in the observations (22:458).

The trend lines are calculated from the SPSS program REGRESSION. In most of the models, the year group is used as the independent variable and all summations are over a time series data base.

Projection or extrapolation of trend values is performed by substituting the X value of interest into the calculated trend equation $Y = \beta_0 + \beta_1 X$.

Percents of trend are additional components of a time series. The classical multiplicative time series model for annual data becomes $Y = T \cdot C \cdot I$, if seasonal component is omitted, because it pertains to cyclical movements with a period of one year or less (22:617). A time series is a sequence of n observations $Y_1, Y_2, \ldots Y_n$, at equally spaced points in time. In the above equation T equals trend, C equals cyclical influences, and I equals irregular components. The trend component (T) is the linear regression of the time series. The cyclical component (C) describes the net effect of a variety of interrelated factors that tend to shift in direction from time to time and to vary in intensity and impact. The irregular component (I) describes residual movements that remain after the other components have been taken into account. These movements reflect nonrecurring factors such as crises, pay, or political actions (4:611-614).

If each observation Y in the annual time series is divided by the trend T, a combined cyclical-irregular component is produced

$$CI = \frac{Y}{T} \quad \text{(annual data)}$$

which is called percents of trend (22:618).

Example: Second Term Retention, Computer Technician 511X0 Model.

The R^2 value for this model obtained from the SPSS REGRESSION computer printout is .58115. There is a moderate variability between Y and X.

For a simple linear regression model

$$F^* = F(1,n-2)$$

where F^* was given on the computer printout.

The alternatives were (22:479):

H_0: $\beta_1 = 0$, there is no relationship between Y and X;

H_1: $\beta_1 \neq 0$, there is a relationship between Y and X.

The appropriate decision rule for an α risk was

If $F^* \leq F(1-\alpha;1,n-2)$, conclude H_0;

If $F^* > F(1-\alpha;1,n-2)$, conclude H_1.

where $F(.95;1,6) = 5.99$; n=8 years (8:98).

This was the critical value. The F* value from the computer printout was 8.325 so F* > F(critical) H_1 was concluded, that a relation existed between Y and X. A trend equation was obtained from the printout:

$$T_t(Y) = 228.7 - 2.238\ X_t$$

substituting the year (81) for (X_t) in the above equation:

$$T_{81} = 228.7 - 2.238\ (81);$$
$$T_{81} = 47.42.$$

<u>Prediction Intervals for Y_t</u>

It is assumed that the parameters β_0, β_1 and σ^2 of the simple linear regression model are known. The equation for the prediction interval becomes (22:455):

$$L \leq Y_p \leq U \qquad Y_p = \text{prediction}$$

where $L = Y_t - t(1-\alpha/2;n-2)\,s(dh)$

$U = Y_t + t(1-\alpha/2;n-2)\,s(dh)$

$$s(dh) = \left[\text{MSE}\left[1 + \frac{1}{n} + \frac{(x_h-\bar{x})^2}{\Sigma(x_i-\bar{x})^2}\right]\right]^{\frac{1}{2}}$$

and MSE (error mean square) =

$$\frac{\left[\Sigma Y_i^2 - \dfrac{(\Sigma Y_i)^2}{n}\right] - \dfrac{\Sigma x_i Y_i - \dfrac{\left[\Sigma x_i \Sigma Y_i\right]^2}{n}}{\Sigma x_i^2 - \dfrac{(\Sigma x_i)^2}{n}}}{n - 2}$$

The β_0, β_1, Y_t and s(dh) can be extracted from the prediction interval request section of the computer program called MULREG, ID=MA580 (18) using a confidence factor of .3 (30 percent chance of exceeding the prediction interval), the equation is stated as:

$$Y_t \pm t(.85,6)s(dh);$$

$$Y_t \pm 1.134\ s(dh);\ \text{or}$$

$$Y_t - 1.134\ s(dh) < Y_p < Y_t + 1.134\ s(dh).$$

For the example:

Continuing the use of the computer technician AFSC, the $Y_t = 47.42$. The computer printout for s(dh) = 6.37. The prediction interval is then calculated:

$$47.42 - 1.134(6.37) < Y_p < 47.42 + 1.134(6.37);$$

$$40.21\% < Y_p < 54.6\% \text{ with } 70\% \text{ confidence for FY 1981.}$$

It can be expected that the percent retention rate will be from 40.21 to 54.6 for second term retention of computer technicians. The percents of trend are:

Value	Year
1.03	(73)
1.03	(74)
1.04	(75)
.99	(76)
.82	(77)
.96	(78)
1.08	(79)
1.07	(80)

These values were caluclated from the computer printout. The percents of trend indicated there was a cyclical-irregular component which increased from the years 1975 to 1979.

Statistical Tests for Means and Analysis of Categorical (Nominal) Variables

The SPSS program CONDESCRIPTIVE is a "descriptive statistic" and includes procedures which help describe the nature of the variable (19:29). The CONDESCRIPTIVE program calculates the following paramters of a variable:

1. mean ($\bar{x}$)
2. variance (s^2)
3. standard deviation (s)
4. minimum/maximum
5. kurtosis
6. skewness
7. sum of the variables (ΣX)
8. .95 confidence interval

The above list describes one variable while the SPSS program CROSSTABS provides a way to observe how two variables are associated (19:36). CROSSTABS can also be used to produce n-way cross-tabulation of variables and to compute a variety of nonparametric statistics based on these tables (23:7).

Finally, in order to make any statistical tests the data must be associated with some levels of measurement. There are four levels (23:4):

1. Nominal
2. Ordinal
3. Interval
4. Ratio

Nominal level is the lowest because it makes no assumptions about the values being assigned to the data. Each value is a distinct category, and the value serves only as a label or name. Ordinal level is a rank order of the categories according to some criterion. Interval level has the property of ordering and distances between the categories are defined in terms of fixed and equal units. Ratio level has all the properties of the interval scale plus the property that the zero point is inherently defined by the measurement scheme (23:5). In this analysis interval and ratio levels were used.

Example:

Interval and ratio CONDESCRIPTIVE computer outputs for Career Retention of the Avionics 326X0 field provides the following information:

mean 61.68   std err 3.729   std dev 10.547
variance 111.237   kurtosis -1.870   skewness -.059
minimum 40.0   maximum 100.0   sum 475.47
.95 confidence interval   52.665 to 70.500

APPENDIX C

ANNUAL REENLISTMENT/RETENTION DATA

423X0	FIRST SEP	FIRST ELIG	FIRST REENL	FIRST %	SECOND SEP	SECOND ELIG	SECOND REENL	SECOND %	CAREER SEP	CAREER ELIG	CAREER REENL	CAREER %
70	870	755	55	7.3		* 617	457	379	82.9			
71	1,149	1,008	118	11.7		* 530	354	317	89.5			
72	575	391	127	32.5		* 597	338	318	94.1			
73	780	608	93	15.3	51	42	33	78.6	549	367	360	98.1
74	682	453	109	24.1	68	49	41	83.7	454	225	217	96.4
75	512	280	98	35.0	138	114	89	78.1	443	197	195	99.0
76	644	348	129	37.1	208	193	156	80.8	300	181	160	88.4
77	582	335	144	43.0	132	118	97	82.2	275	155	149	96.1
78	424	227	77	33.9	72	62	41	66.1	186	107	101	94.4
79	426	279	87	31.2	90	80	53	66.3	178	145	132	91.0
80	541	374	97	25.9	101	95	58	61.1	224	173	154	89.0
461X0												
70	1,374	1,259	232	18.4		* 641	522	464	88.9			
71	1,374	1,130	253	22.4		* 598	427	394	92.3			
72	1,237	1,085	146	13.5		* 686	466	433	92.9			
73	759	621	126	20.3	131	104	77	74.0	659	427	415	97.2
74	1,446	1,083	168	15.5	225	174	125	71.8	571	354	341	96.3
75	655	376	119	31.6	256	225	163	72.4	524	300	281	93.7
76	1,104	687	289	42.1	225	205	151	73.7	530	346	326	94.2
77	695	386	227	58.8	217	196	156	79.6	501	365	355	97.3
78	716	410	151	36.8	168	141	110	78.0	409	286	277	96.9
79	1,017	605	176	29.1	191	173	124	71.7	431	290	272	93.8
80	700	383	142	37.1	209	192	128	66.7	437	324	306	94.4

*Second-term and Career airmen reenlistment rates were combined until 1973.

(Source: Letter, dated 4 Feb 1981, subject: Reenlistment/Retention Rates, Director of Personnel Procurement, MPC, Randolph AFB, Texas.

	FIRST				SECOND				CAREER			
304X0	SEP	ELIG	REENL	%	SEP	ELIG	REENL	%	SEP	ELIG	REENL	%
70	829	748	69	9.2			* 486	379	304	80.2		
71	814	707	71	10.0			* 471	373	325	87.1		
72	662	521	96	18.4			* 537	406	372	91.6		
73	756	598	102	17.1	211	91	69	75.8	461	341	329	96.5
74	853	615	140	22.8	105	93	71	76.3	323	222	213	95.9
75	653	396	127	32.1	104	91	66	72.5	361	241	236	97.9
76	524	323	83	25.7	118	109	84	77.1	325	248	229	92.3
77	525	347	67	19.3	112	104	70	67.3	307	215	201	93.5
78	304	159	51	32.1	133	120	67	55.8	221	165	156	94.5
79	418	298	93	31.2	108	92	48	52.2	225	172	160	93.0
80	420	270	91	33.7	116	102	68	66.7	291	204	190	93.1
316X0												
70	272	250	83	33.2			* 344	243	224	92.2		
71	442	411	117	28.5			* 361	241	224	92.9		
72	352	312	175	56.1			* 460	333	309	92.8		
73	405	340	85	25.0	80	74	49	66.2	431	281	274	97.5
74	534	379	124	32.7	109	103	76	73.8	359	192	191	99.5
75	695	425	198	46.6	154	136	86	63.2	381	189	187	98.9
76	602	390	122	31.3	181	168	91	54.2	295	189	178	94.2
77	467	308	60	19.5	92	83	53	63.9	219	159	143	89.9
78	277	156	58	37.2	99	86	39	45.3	162	126	102	81.0
79	379	267	104	39.0	126	122	59	48.4	182	138	121	87.7
80	324	240	61	25.4	91	87	49	56.3	209	151	124	82.1

*Second-term and Career airmen reenlistment rates were combined until 1973.

	FIRST				SECOND				CAREER			
326X0	SEP	ELIG	REENL	%	SEP	ELIG	REENL	%	SEP	ELIG	REENL	%
70	7	7	2	28.6			* 28	26 25	96.2			
71	4	2	2	100.0			* 33	26 22	84.6			
72	3	2	-	0.0			* 51	44 39	88.6			
73	12	3	3	100.0	10	9	6	66.7	82	61	58	95.1
74	42	27	13	48.1	9	9	9	100.0	70	41	38	92.7
75	55	31	14	45.2	13	11	6	54.5	66	34	34	100.0
76	51	25	15	60.0	7	6	4	66.7	46	32	30	93.8
77	153	93	23	24.7	38	33	20	60.6	81	62	60	96.8
78	89	48	14	29.2	27	24	12	50.0	64	52	47	90.4
79	64	44	10	22.7	10	9	4	44.4	35	23	20	87.0
80	56	48	7	14.6	8	8	6	75.0	34	21	16	76.2
511X0												
70		NO AFSC					NO AFSC					
71		NO AFSC					NO AFSC					
72	464	376	201	53.5		* 337	260 245	94.2				
73	715	592	142	24.0	102	82	68	82.9	504	376	373	99.2
74	725	566	226	39.9	147	124	95	76.6	492	336	325	96.7
75	638	511	212	41.5	245	212	155	73.1	555	336	320	95.2
76	307	206	60	29.1	380	349	220	63.0	549	398	352	88.4
77	449	312	124	39.7	184	163	84	51.5	399	270	246	91.1
78	1,008	350	244	69.7	205	185	107	57.8	314	216	201	93.1
79	804	672	404	60.1	174	156	97	62.2	380	280	236	84.3
80	734	569	285	50.1	190	167	101	60.5	405	276	243	88.0

*Second-term and Career airmen reenlistment rates were combined until 1973.

902X0	FIRST				SECOND				CAREER			
	SEP	ELIG	REENL	%	SEP	ELIG	REENL	%	SEP	ELIG	REENL	%
70	1,505	955	103	10.8	* 854	625	510	81.6				
71	2,494	1,808	202	11.2	* 892	559	486	86.9				
72	1,801	964	269	27.9	* 989	617	558	90.4				
73	1,630	904	214	23.7	174	125	79	63.2	683	384	366	95.3
74	2,250	1,344	437	32.5	170	129	93	72.1	520	276	264	95.7
75	2,187	1,310	240	18.3	282	215	166	77.2	672	365	345	94.5
76	1,586	842	339	40.3	309	261	173	66.3	504	348	312	89.7
77	1,840	1,130	272	24.1	278	238	152	63.9	410	266	236	88.7
78	1,176	664	210	31.6	310	273	165	60.4	340	231	217	93.9
79	1,363	851	353	41.5	217	175	108	61.7	417	292	269	92.1
80	1,524	966	338	35.0	297	267	168	62.9	558	412	379	92.0

*Second-term and Career airmen reenlistment rates were combined until 1973.

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